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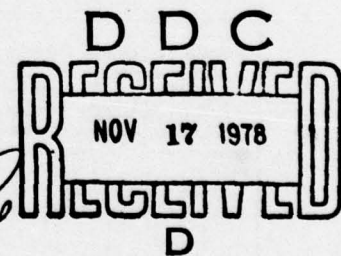
**CANOPY SUN GLINT EVALUATION COMPUTER PROGRAM**

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September 1978

Final Report for Period August 1976 - July 1977

Approved for public release;  
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Prepared for  
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## APPLIED TECHNOLOGY LABORATORY POSITION STATEMENT

This document and associated computer program will provide a useful tool in the design and development of helicopter canopies that are to have low sun glint signature characteristics. It will permit the rapid and inexpensive evaluation of various configurations in the initial design phase of a new aircraft as well as retrofit configurations for existing aircraft. Results of this program will advance the technology needed to improve combat effectiveness and survivability of Army aircraft.

Earl C. Gilbert of the Aeronautical Systems Division served as project engineer for this effort.

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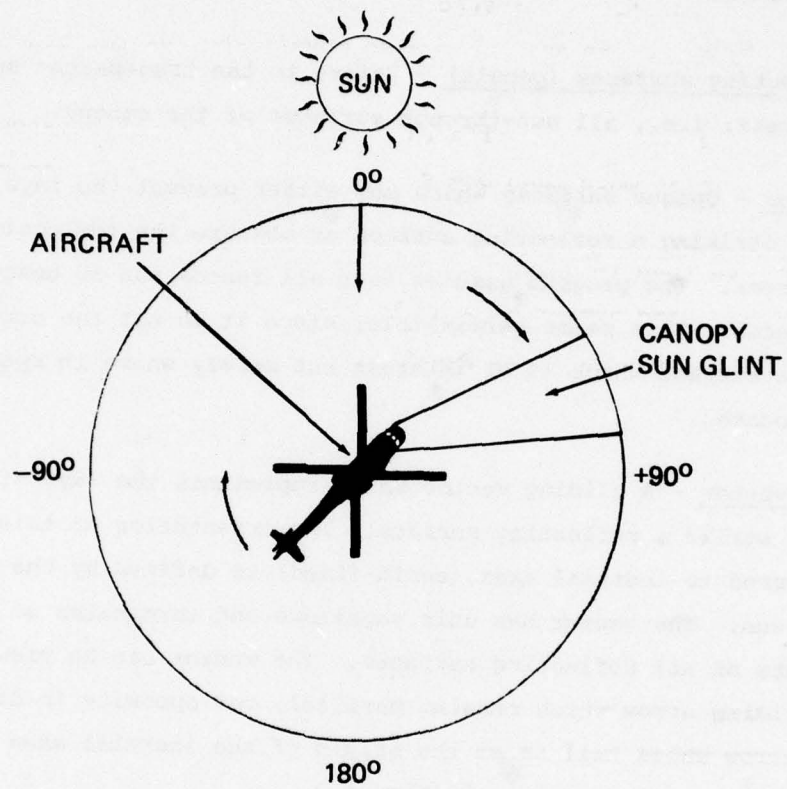
## INTRODUCTION

Canopy sun glint is a major cue in the visual detection of aircraft. Therefore, it would be desirable to have a method to calculate the magnitude of these sun glints for a proposed or experimental canopy. The computer program described in this report is an attempt to provide an analytical method to solve this problem for smooth reflecting surfaces. However, certain limitations were necessary to maintain a degree of simplicity. These limitations, which include the restriction that any section of a reflecting surface have a quadratic representation, are discussed.

#### DESCRIPTION OF PROBLEM

An aircraft canopy reflects the rays of the sun at azimuth and elevation angles that are a function of the geometry of the canopy and the orientation of the aircraft with respect to the sun. As the aircraft rotates, as shown in Figure 1, the sun glint also moves; and, as the orientation of the aircraft changes with respect to the sun, more or different canopy panels can become the reflecting surfaces. At any one instant, canopy sun glints may be visible at more than one set of azimuth and elevation coordinates.

The objective then in designing a canopy to minimize visual detection is to limit the size and number of sun glints occurring within the band of coordinates which are probable positions for hostile observers. To evaluate the effectiveness of such a design, there is a choice between experimental testing and analysis. There are at least two problems with experimentally testing new canopy designs. First, if a scaled model is used, getting the proper curvature on the panels could be time-consuming and expensive. Second, if a mockup is used, greater distances are required to simulate a real situation. In either case, the evaluation of a large family of curves, or variations of a basic design, would be difficult. This is not to say that an analytical approach is without problems; there are certain limitations that must be imposed. But the simple fact that a large number of different designs can be evaluated rapidly makes the analytical scheme attractive. The problem then is to develop an analytical method to determine the coordinates of the sun glint.



**Figure 1. Variation of Sun Glints With Aircraft Heading.**



## DEFINITIONS

Before proceeding any further with the discussion, some useful definitions are presented:

- Reflecting surfaces (panels) - Refers to the transparent surfaces of interest; i.e., all see-through surfaces of the canopy.
- Fences - Opaque surfaces which may either prevent the rays of the sun from striking a reflecting surface or obscure the reflection from the observer. The program assumes that all fences can be described by flat surfaces. This seems permissible, since it is not the curvature of the fence surface which is of interest but merely where in space the fence is located.
- Sun vector - A sliding vector which represents the rays of the sun as they strike a reflecting surface. The orientation of this vector as referred to inertial axes (earth-fixed) is defined by the elevation of the sun. The vector has unit magnitude and terminates at all boundary points of all reflecting surfaces. The vector can be viewed as simply a sliding arrow which remains parallel, but opposite in direction, to an arrow whose tail is at the origin of the inertial axes and points toward the sun, as shown in Figure 2.
- Reflection vectors - Each boundary point on a reflecting surface has a reflection vector associated with it, as shown in Figure 3. Mathematically, it is formed by taking the sun vector and retaining the portion which is tangent to the reflecting surface while reversing the portion which points toward the surface along the normal. As the normal varies from point to point, so does the reflection vector.
- Inertial axes - Earth-fixed axis system with origin at the center of rotation of the aircraft. The positive X axis points in the direction of the sun while the positive Z axis points away from the center of earth. The Y axis forms right angles with the X and Z axes and has positive sense to the right when facing the sun (see Figure 4).



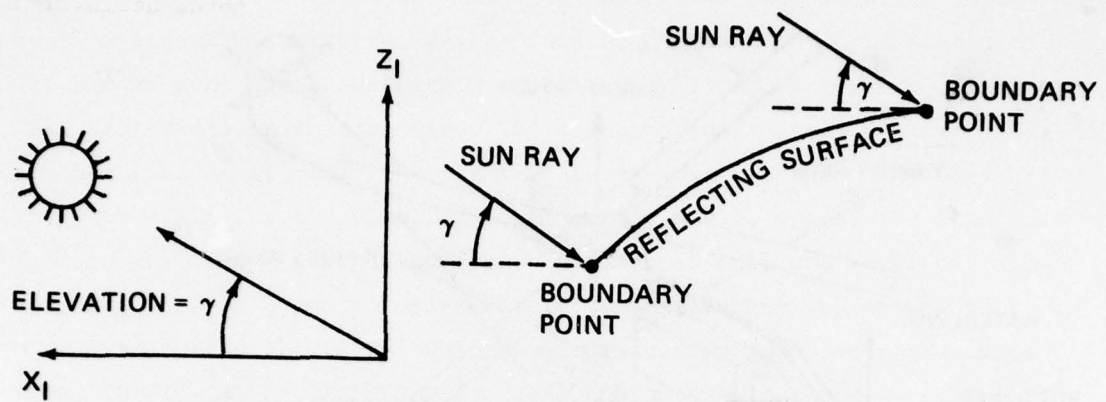


Figure 2. Sun Vector.

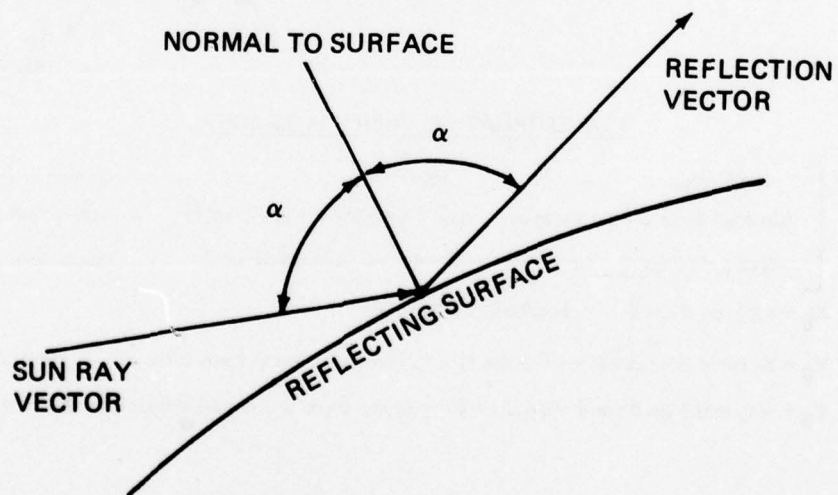
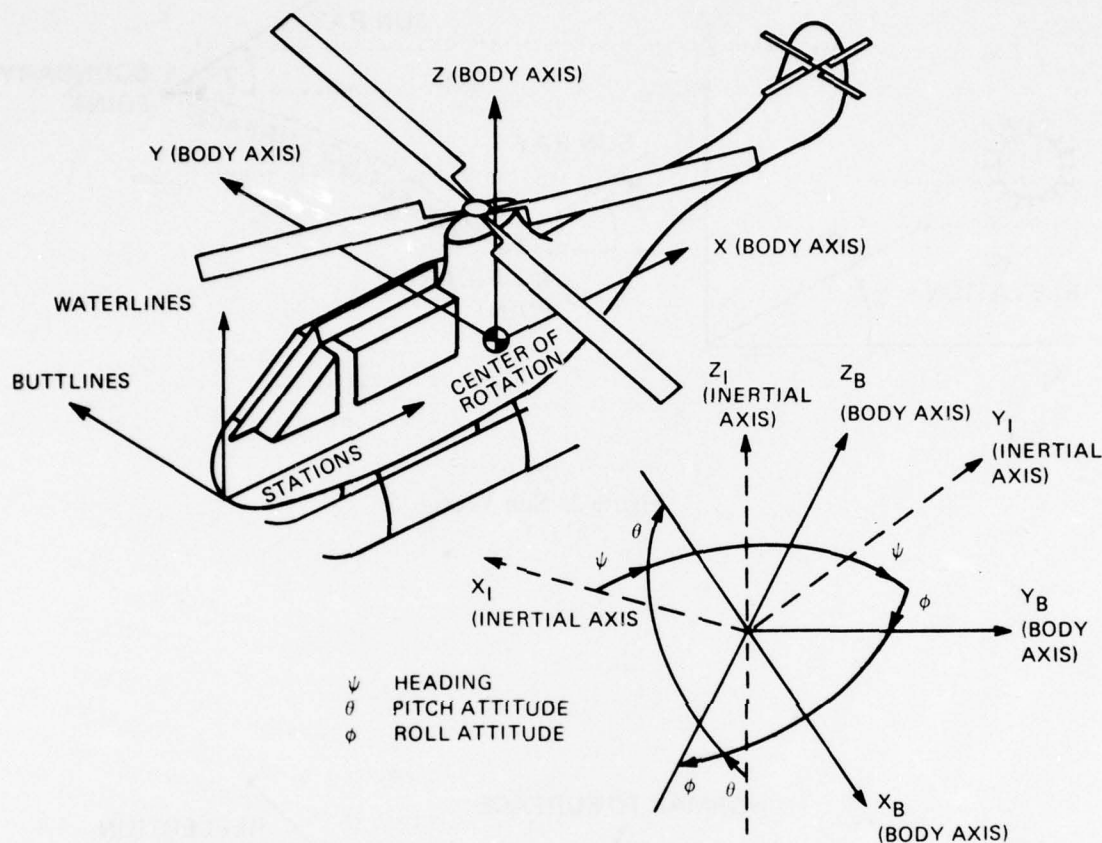


Figure 3. Basic Relationship Between Striking Sun Ray and Reflection Vector.



TRANSFORMATION: INERTIAL TO BODY

$$\begin{bmatrix} -\cos \theta \cos \psi & -\cos \theta \sin \psi & -\sin \theta \\ (\sin \phi \sin \theta \cos \psi - \sin \psi \cos \phi) & (\sin \phi \sin \theta \sin \psi + \cos \psi \cos \phi) & -\sin \phi \cos \theta \\ -(\cos \phi \sin \theta \cos \psi + \sin \psi \sin \phi) & (\sin \phi \cos \psi - \cos \phi \sin \theta \sin \psi) & \cos \phi \cos \theta \end{bmatrix}$$

$$X_B = -X_I \cos \theta \cos \psi - Y_I \cos \theta \sin \psi - Z_I \sin \theta$$

$$Y_B = X_I (\sin \phi \sin \theta \cos \psi - \sin \psi \cos \phi) + Y_I (\sin \phi \sin \theta \sin \psi + \cos \psi \cos \phi) - Z_I \sin \phi \cos \theta$$

$$Z_B = -X_I (\cos \phi \sin \theta \cos \psi + \sin \psi \sin \phi) + Y_I (\sin \phi \cos \psi - \cos \phi \sin \theta \sin \psi) + Z_I \cos \phi \cos \theta$$

**Figure 4. Axis Systems.**

Aircraft headings are measured relative to this axis system and are positive as shown in Figure 1. Sun glint position is also measured relative to these axes as shown in Figure 5.

- Body axes - Body-fixed axis system with origin at the center of rotation of the aircraft. The positive X axis points toward the tail of the aircraft while the positive Z axis points toward the top of the aircraft. The Y axis is positive out the right side of the aircraft and, along with the X and Z axes, forms an orthogonal system. These axes are assumed parallel to the station line, buttline, and waterline reference system as shown in Figure 4.
- Sun glints - In this report, a sun glint refers to the single image produced by one reflective surface for one set of aircraft and sun positions. If the reflection vectors are extended, as shown in Figure 5, until they intersect an imaginary cylinder in space, the image produced is a sun glint. The whole thing can be visualized as if the aircraft were sitting in the center of a circular stadium and the stands were filled with hostile observers. These stands are strictly vertical and form the rim of the stadium. The reflection vector from each boundary point, when extended, will strike someone in the stands. If each person that is struck stands up, the outline of an image is formed. The image formed from the reflection vectors of one reflective surface will be called the sun glint of that surface at the specified aircraft and sun conditions. Since the radius (distance to observers) of the stadium is a fixed input value, the location of any person in the stands is defined completely by specifying two angles. The two angles are measured relative to the inertial axes. To locate a person, first rotate the X inertial axis about the Z axis until it intersects the stands directly below the person (azimuth angle); then rotate the X axis about the Y axis until the X axis points directly at the person (elevation angle). In the same way the boundary points of the sun glint are defined by an azimuth angle and an elevation angle. These coordinates (angles) form the results of this program.

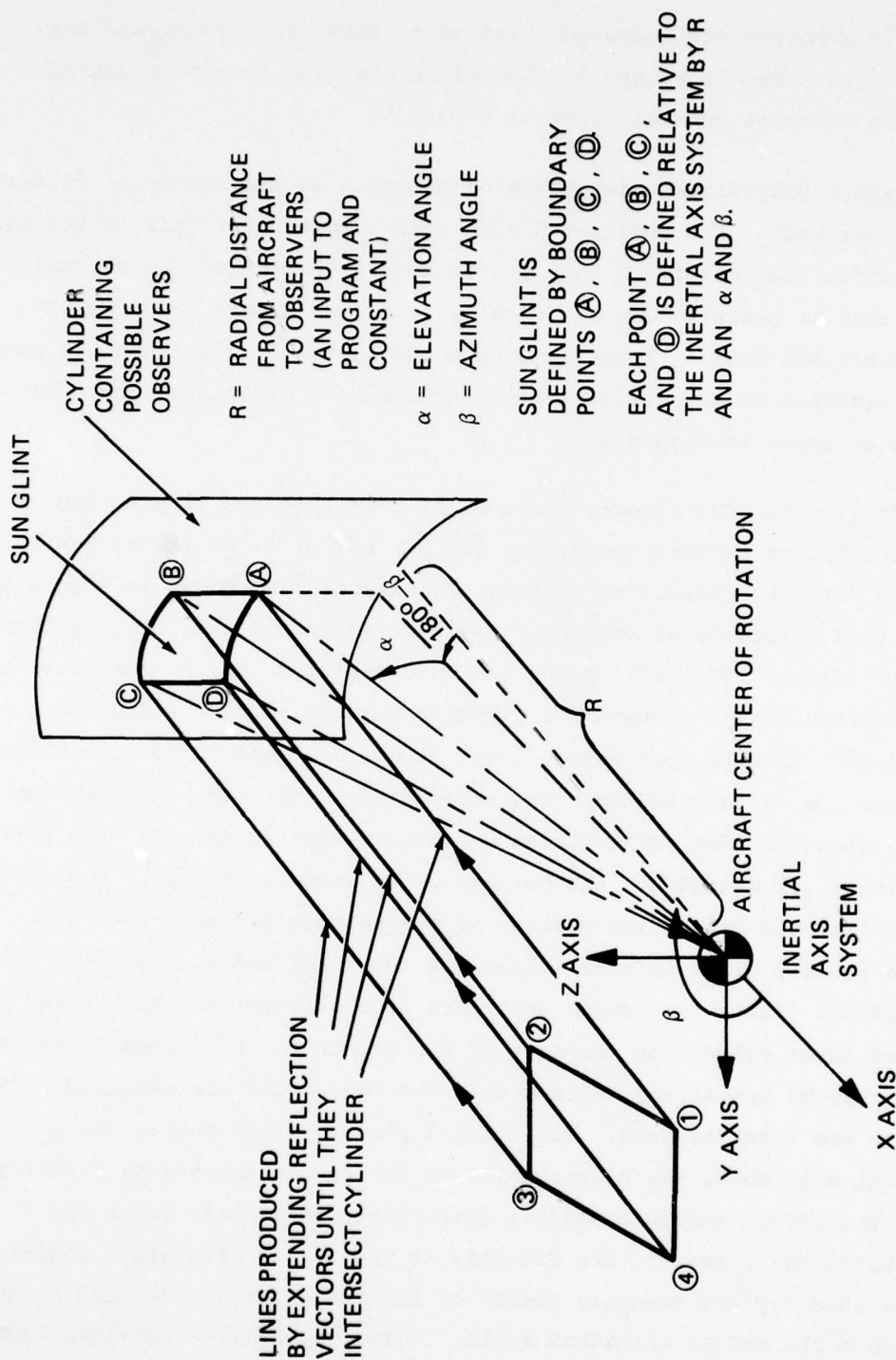


Figure 5. Definition of Sun Glint.



- Sun glint signature - This is the plot of all the coordinates of all the sun glints from all the reflective surfaces for one sun elevation. A sample plot for an imaginary canopy is shown in Figure 6.
- Probability - The probability of being observed is defined to be the ratio of two areas. The numerator is the area within the glint signature plot which is swept out by the reflected canopy sun glints as the aircraft is rotated 360 degrees in heading. The denominator is the total area enclosed by the rectangle formed by the maximum and minimum allowable elevation and azimuth angles of the observer. As an example, consider Figure 6. The area swept out is approximately  $(135 - (-150)) \times (5 - (-5)) = 2,850 \text{ degrees}^2$ . The total allowable area is  $(180 - (-180)) \times (10 - (-10)) = 7,200 \text{ degrees}^2$ . The probability would then be  $\frac{2,850}{7,200} = 0.396$ . In the calculation of the swept area, overlap is ignored; that is, if a portion of the sun glint signature plot is covered by the sun glints from more than one surface, the area is only counted once.

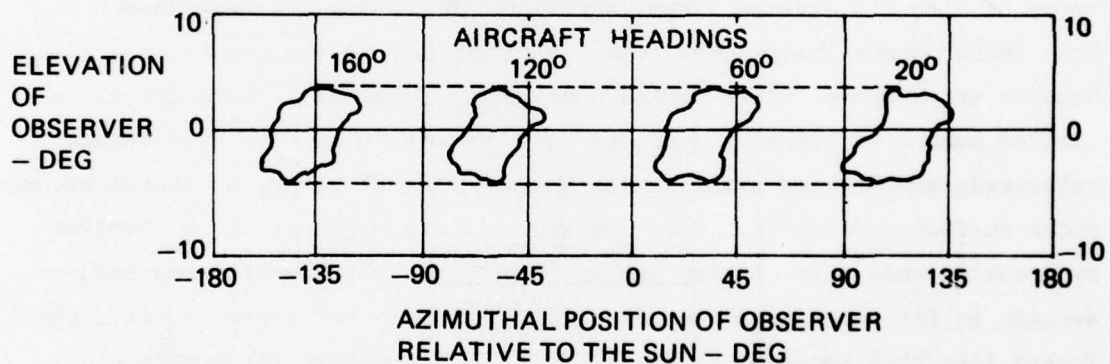


Figure 6. Sun Glint Signature.

#### METHOD OF SOLUTION

The rays of the sun, treated as parallel vectors, strike the canopy and are reflected by the canopy. The method of solution is basically simple; the trimmings make it complicated. The reflecting surface is assumed to be smooth, and therefore, the reflection vector becomes a function of the angle between the striking sun rays and the normal to the surface, as was shown in Figure 3. This angle may vary as the relative position between the aircraft and the sun varies, for instance, due to aircraft heading changes. It could also vary from point to point on the surface as the normal to the surface varies, as in the case of a curved panel.

It is necessary then to determine at all the boundary points of all the reflective surfaces the normals to those surfaces. One method considered was to input the normals for all the reflective surfaces.

However, these normals are not readily available in most cases. Therefore, an alternate approach was taken. The location of the boundary points in terms of aircraft station lines, buttlines, and waterlines was used. From these points the program fits a surface through the points in a least-squares error sense. This method does have a drawback. There are an unlimited number of types of surfaces that could be used. To keep things relatively simple, and still handle the majority of cases, a general second-order surface was chosen. More complex reflective panels can be handled by breaking them into smaller panels (sections), thereby allowing each section to fit a different second-order equation. For instance, if a panel looked like that shown in Figure 7, breaking it up into three panels as shown should yield an acceptable fit.

Once the equation of the reflective surface is known, the normal at any point on the surface is known. Then, selecting an aircraft orientation (pitch, roll, and heading) and sun elevation, the angle between the sun vector and any surface normal can be calculated. The reflection vector at each boundary point is then known; and from the reflection vectors, the sun glints can be formed, as was shown in Figure 5.

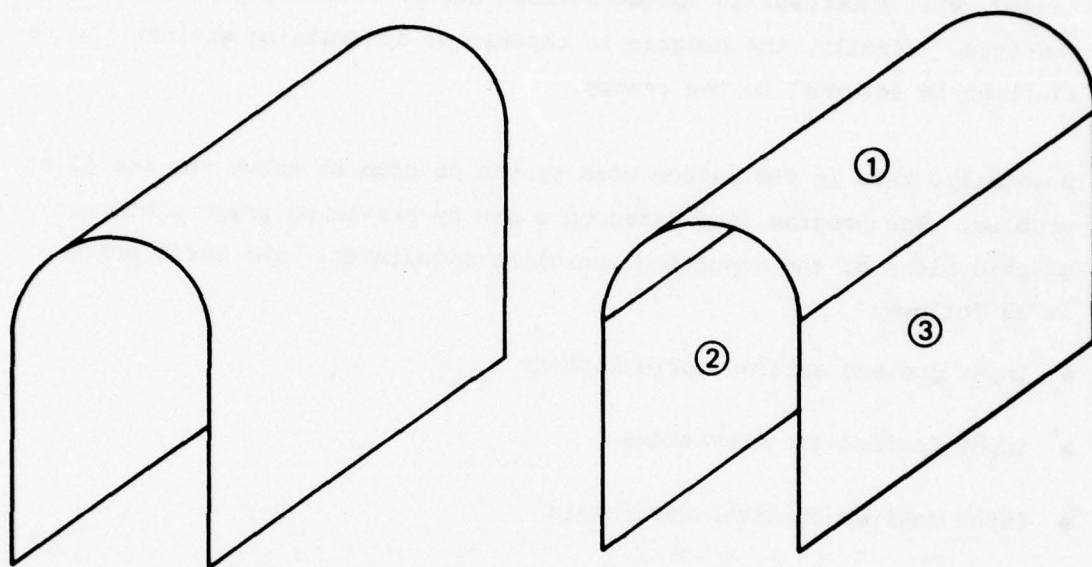


Figure 7. Segmentation of a Compound Surface.



It has been assumed so far that the sun rays are free to strike every boundary point on the surface. The program, however, is capable of determining whether an opaque surface (fence), defined by boundary points, comes between the sun and a reflective surface boundary point. The program is also capable of determining whether a reflection vector, if extended, will intersect an opaque surface before reaching a possible observer. Finally, the program is capable of determining whether the reflection is internal to the canopy.

Basically, this is the method used by the program to solve the sun glint problem. The program is dressed up a bit by providing print plots and graphic plots of the resulting sun glint signatures. The total scheme is as follows:

- Input desired aircraft orientations
- Input desired sun elevations
- Input desired observer restraints
- Input the boundary points for all fences and all reflective surfaces
- Curve-fit boundary points
- Calculate relative position of sun vector and reflective surface
- Determine if any fences lie between sun and reflective surface
- Calculate normals to reflective surface at boundary points
- Calculate reflection vectors
- Determine if reflection vectors when extended intersect any fences
- Determine if reflection is internal to canopy
- Calculate observer positions (sun glints)
- Calculate probabilities from sun glint signatures.



### PROGRAM FLOW CHARTS

Presented in this section are the flow charts for the executive (main) routine and each subroutine which contains at least one CALL statement. The blocks that are shown within a particular flow chart refer only to the CALL statements in that routine. If a subroutine is called which calls another subroutine, only the first CALL statement appears. However, in the flow chart for the first subroutine called will appear the CALL statement to the second subroutine. In other words, only one level of calls appear in any flow chart. For example, in the executive routine there is a call to subroutine CFITF, which would result in calls to subroutines NORM, CURFIT, SIGNF, AND EQNSOL. This can be seen by looking at the flow charts for CFITF and CURFIT.

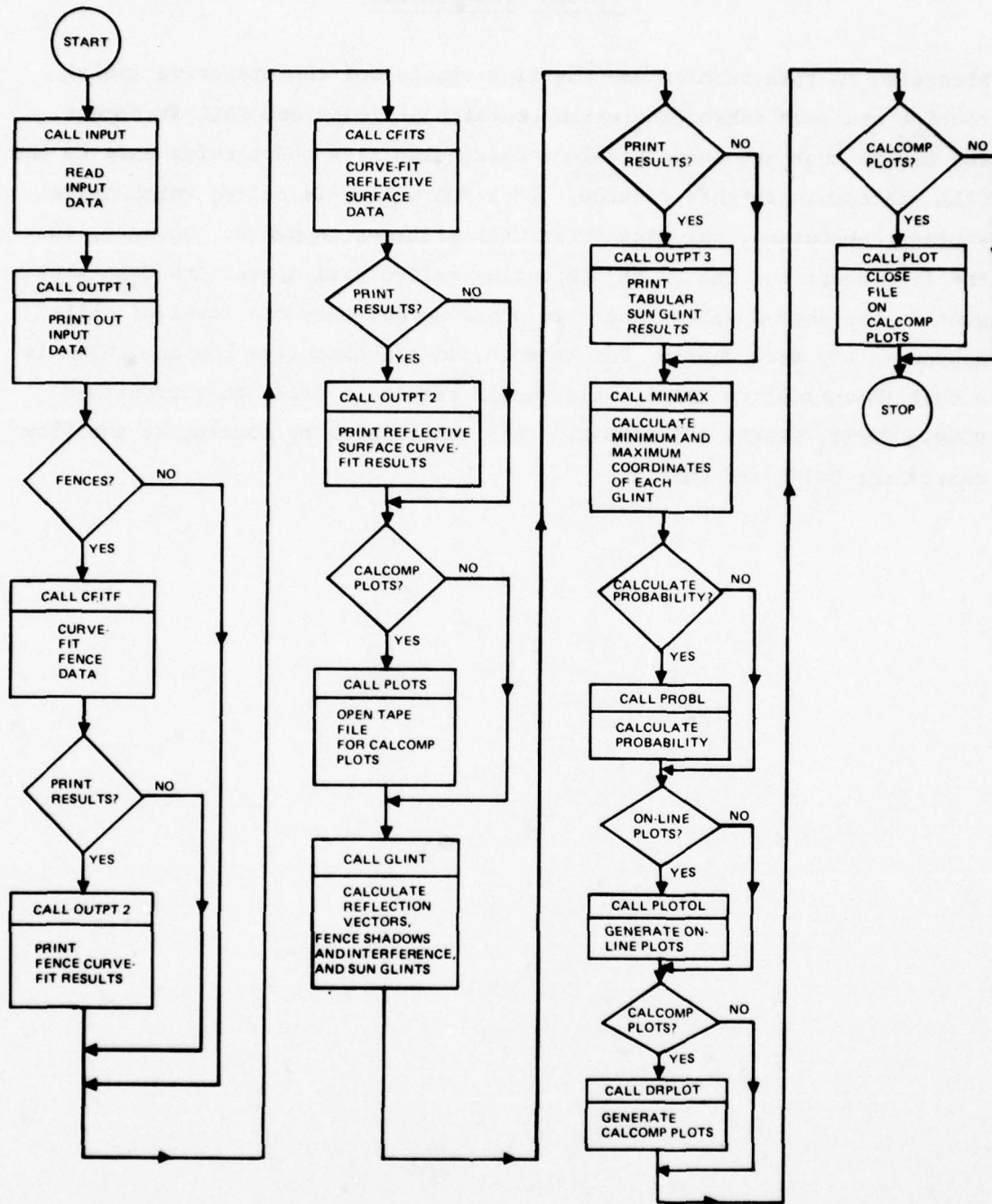


Figure 8. Executive Flow Chart

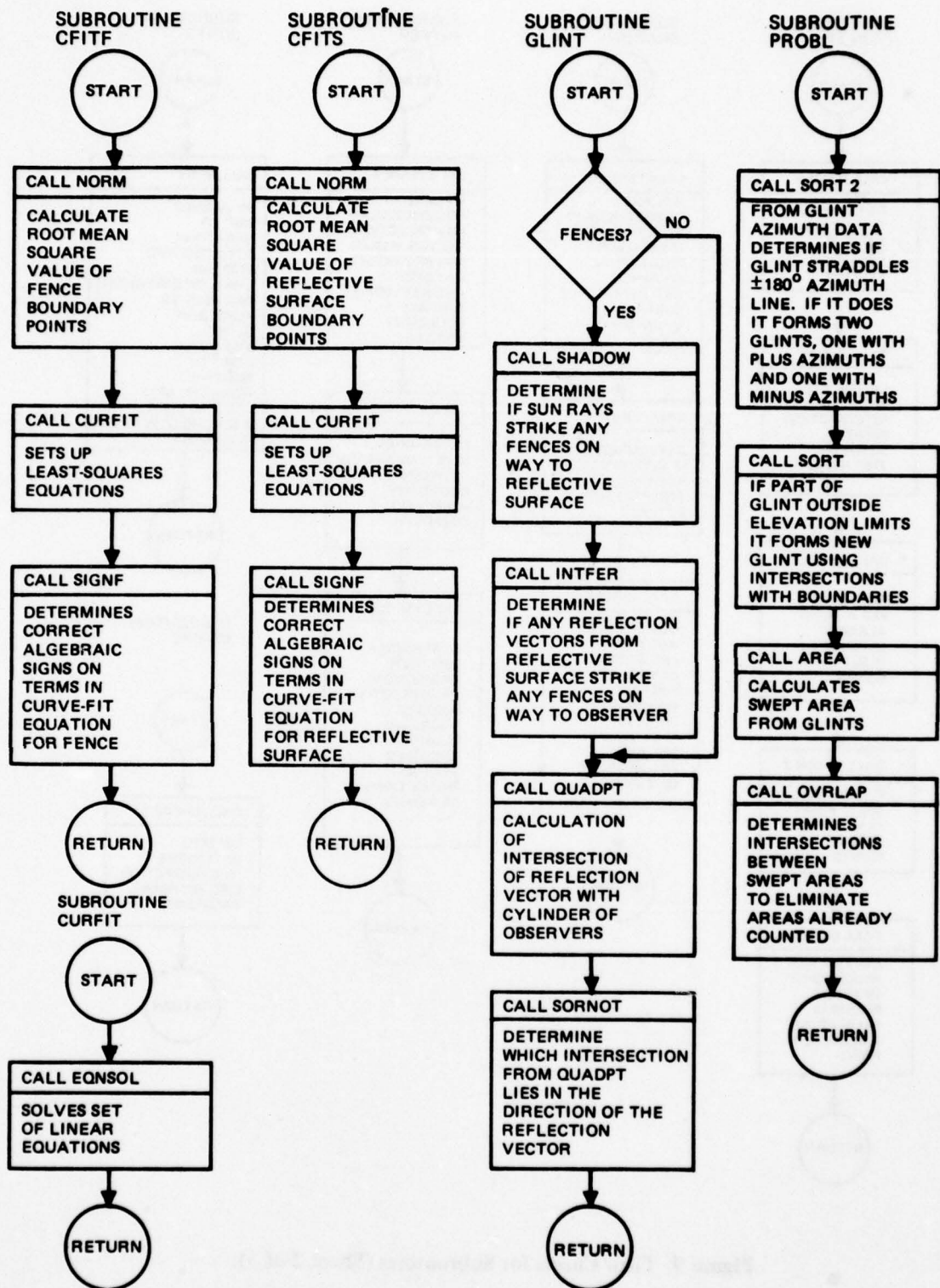


Figure 9. Flow Charts for Subroutines (Sheet 1 of 3).



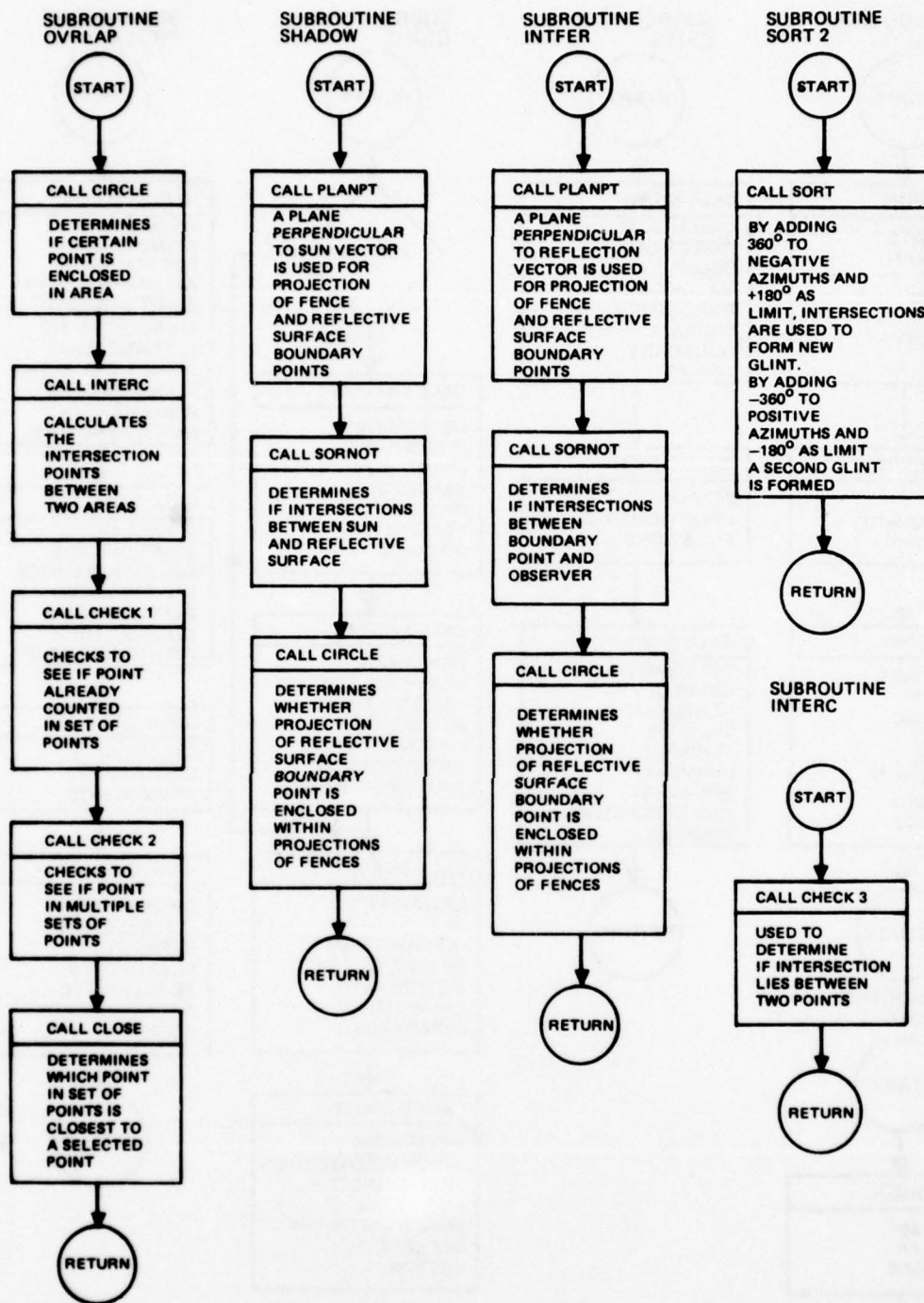


Figure 9. Flow Charts for Subroutines (Sheet 2 of 3).

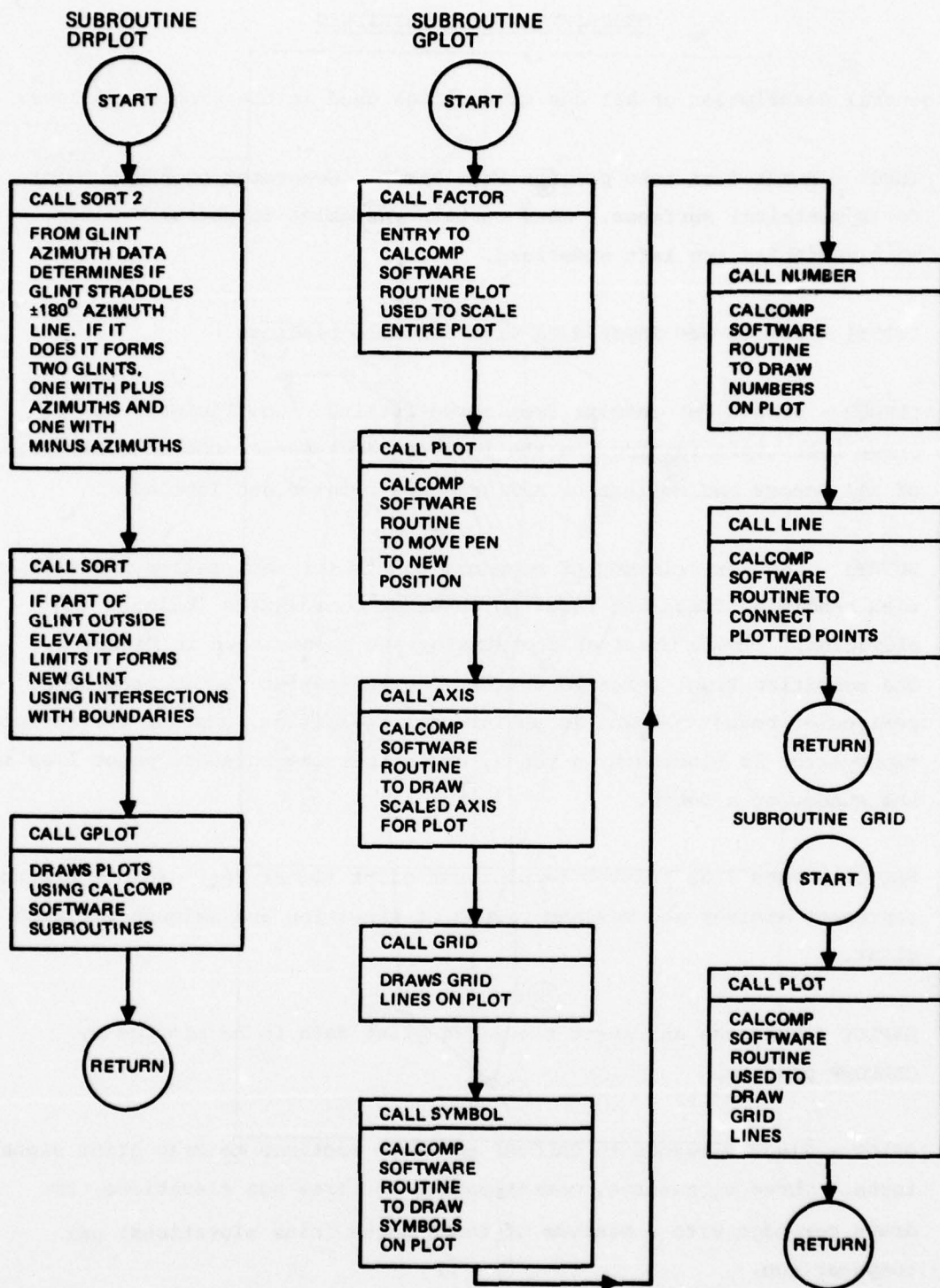


Figure 9. Flow Charts for Subroutines (Sheet 3 of 3).

### DESCRIPTION OF SUBROUTINES

A general description of all the subroutines used in the program follows:

- INPUT - Reads data into program from cards. Generates boundary points for symmetrical surfaces. Sets certain variables to default values, when variables are left undefined.
- OUTPT1 - Prints out input data with suitable headings.
- OUTPT2 - Prints out results from curve-fitting. Coefficients of the curve best approximating, in the least-squares sense, the boundary points of all fences and reflective surfaces are printed and labeled.
- OUTPT3 - Tabular printout of boundary points for each reflective surface with condition flags and required observer coordinates (azimuth and elevation). These observer coordinates are those shown in Figure 5. The condition flags refer to whether the reflection vector from each particular boundary point is an internal reflection, whether the reflection vector is blocked by a fence, or whether the boundary point lies in the shadow of a fence.
- PLOTOL - Uses line printer to plot sun glint signatures. Points plotted represent minimum and maximum values of elevation and azimuth for each glint.
- DRPLOT - Prepares and sorts tabulated glint data to be plotted by CALCOMP plotter.
- GPLOT - Gives commands to CALCOMP software routines to draw glint signatures. Three signatures, corresponding to three sun elevations, are drawn per page with a maximum of three pages (nine elevations) per computer run.



- PLOTS, FACTOR, PLOT, AXIS, SYMBOL, NUMBER, and LINE - CALCOMP software functions which are supplied by CALCOMP BASIC SOFTWARE package.
- GRID - Normally a CALCOMP software routine; this subroutine was written and included as part of the program since it is not part of the basic packages supplied to some CALCOMP users. If system already has GRID, modify subroutine name and call statement to make it unique, i.e., GRIB instead of GRID.
- CFITF - Along with the subroutines NORM, CURFIT, SIGNF, and EQNSOL, curve-fits the boundary points of a fence to a plane (linear) surface in space.
- NORM - In an attempt to minimize numerical errors during curve-fitting, boundary points are normalized. This routine calculates a norm which is the root-mean-square value of the set of coordinates representing the boundary points.
- CURFIT - Sets up the normal coefficient matrix and constant terms for the least-squares solution. Calculates the root-mean-square error of the fit by plugging boundary points into the equation of the fitted surface.
- EQNSOL - Solves a system of linear, homogeneous or inhomogeneous, equations using the technique of Gaussian elimination. It is used to solve for coefficients of the fitted surface.
- SIGNF - A surface which is represented by an equation in terms of its coordinates can also be represented by the negative of the equation. In other words,

$$Ax + By + Cz + D = 0 = -Ax - By - Cz - D.$$

In one case, the program will generate an outward normal to the canopy while in the other case it will generate an inward normal. In subsequent calculations, the program requires that the normal be outward. Therefore,

SIGNF is used to determine correct sign on coefficients. It does this using tests on the two possible normal vectors.

- CFITS - A set of boundary points representing a reflective surface is used to produce, in general, a quadratic equation (a plane surface is considered a degenerate quadratic surface). This equation is an analytical representation of the points in a least-squares error sense. There are three options available when trying to match an equation to a set of points. The first is to specify the coefficients, either all or some. In this case the calculated values are overridden by the input values. The second option is to specify which coefficients are to be included in the matching equation. For instance, if the program user wished the surface through the boundary points to be quadratic in x while linear in z, he would specify through his inputs that the other terms in the general quadratic equation be ignored. The third option, which is probably the most useful, starts out by trying to match the points to a linear equation (plane surface). If this equation fails to satisfy the error criteria, the program continues to form quadratic combinations. The combination with the minimum least-squares error is selected.
- GLINT - Calculates the sun glints for each reflective surface as aircraft varies heading. First the components of the sun vector are transformed from the inertial axes to the body axes by the transformation in Figure 4. Then each boundary point of the reflective surfaces is checked to see if it lies in the shadow of a fence. Next the normal to the reflective surface at each boundary point is calculated followed by the calculation of the reflection vectors. Each reflection vector is checked to see if it intersects any fences. Then the components of the reflection vectors are transformed from the body axes to the inertial axes. Finally, these reflection vectors are extended as in Figure 5 to find the coordinates of each sun glint.
- SHADOW - Answers the question, "Is a boundary point of a reflective surface in the shadow of a fence?" To answer this question, first it is determined whether any of the planes containing the fences are

located between the boundary point and the sun. If a fence plane lies between the sun and the reflective surface boundary point, the intersection of the line formed by projecting the boundary point along the sun vector with the plane of the fence is saved. Finally, it is determined whether any of the saved intersections lie within the boundaries of their respective fences. If any of them do, then the reflective surface boundary point is indeed in a shadow and the ISHAD flag is set to one for this point. The coordinates of the sun glint for this point are still calculated and tabulated but not plotted and not used in the probability calculation.

- PLANPT - Given the equation of a plane surface and the representation of a line by a point and direction cosines, the intersection of the line with the plane is calculated.
- SORNOT - Given a point and the coordinates of a unit vector, a line through the point with the same direction cosines as the vector is formed. It is then determined whether a second point on the line is in the positive or negative sense of the vector (see Figure 10).
- INTFER - Answers the question, "Does a reflection vector intersect a fence before reaching a possible observer?" To answer this question, first it is determined whether any of the planes containing the fences are located between the reflective surface boundary point from which the reflection vector emanates and any possible observer. If a fence plane lies between the boundary point and the observer, the intersection of the line formed by extending the reflection vector with the plane of the fence is saved. Finally, it is determined whether any of the saved intersections lie within the boundaries of their respective fences. If any of them do, then the reflection vector does indeed strike a fence and the INTFER flag is set to one for the reflective boundary point corresponding to the reflection vector. The coordinates of the sun glint for this point are still calculated and tabulated but not plotted and not used in the probability calculation.



- QUADPT - Calculates the intersection or intersections of a line with a quadratic surface. Inputs to the subroutine are the coordinates of a point on the line, the direction cosines of the line, and the coefficients of the equation describing the quadratic surface.
  
- MINMAX - Determines minimum and maximum values of the elevations and azimuths for each sun glint. At this point, 0.25 degree is added to the maximums and subtracted from the minimums to represent sun dispersion angle. These values are plotted and used to determine probability.
  
- PROBL - As the aircraft changes heading, with fixed sun elevation and fixed aircraft pitch and roll attitudes, the sun glint from a reflective surface may change position on the sun glint signature plot, as was shown in Figure 6. If all intermediate positions between the discrete sun glint positions calculated are assumed possible, then there is a continuous area swept out during the heading changes. The total of all the areas swept by all the reflective surfaces, but counting any overlap only once, divided by the total area possible will yield the probability for this sun elevation. In programing a method to calculate the swept area, certain assumptions and simplifications were found necessary. Figure 11 shows a hypothetical example of the motion of a sun glint from one reflective surface. The four points shown for each sun glint are the results from MINMAX, which represent the minimum and maximum observer elevations and azimuths for this glint. This is simplification number one, to use only the minimum and maximums to represent each glint. This allows for the generation of the polygon shown in Figure 11 by the dotted lines. The single point (C) at zero aircraft heading is another simplification or assumption and is caused when all the boundary points of the reflective surface at this heading are in the shadow of one or more fences or when the generated reflection vectors are blocked by one or more fences. In other words, there is no glint for this surface at zero heading. However, at headings of  $\pm 80$  degrees there are glints; therefore, the approach chosen was to place a single point at the average azimuth and elevation of the observers had the fences not been there and thus a glint created.

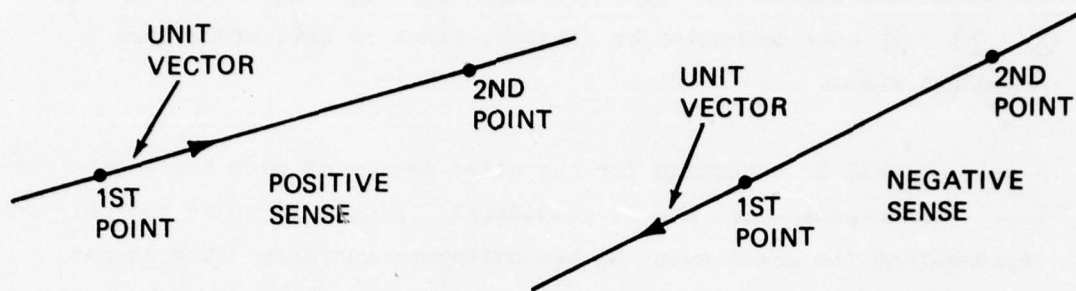


Figure 10. Determination of Positive Sense Between Two Points.

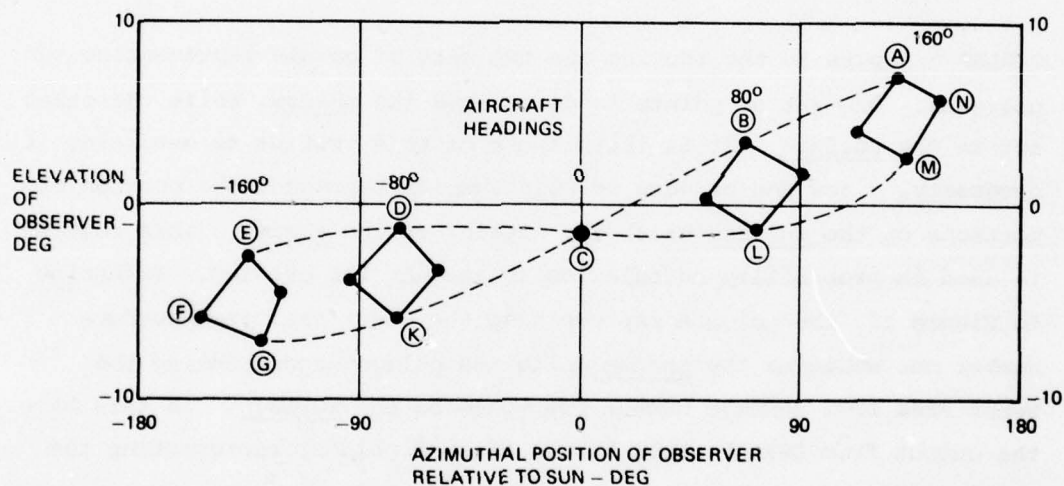


Figure 11. Area Swept by Sun Glints From Single Reflective Surface.

By doing this, the area is tapered to zero on both sides of the point (C). As shown, the points (F) (E) (D) (C) (B) (A) (N) (M) (L) (C) (K) (G) (F) when connected by straight lines in this order form a polygonal shape.

A polygon will be generated for the glint motion of each reflective surface. The overlap must now be considered. Figure 12 shows two polygons representing the areas swept by two different surfaces. The shaded area represents the common area to both polygons. The program treats polygon (1) as if polygon (2) does not exist; thus the shaded area is included in (1). Then polygon (2) is broken up into two polygons formed by the points (P) (Q) (R) (X) (Y) and (SS) (S) (T) (U) (V) (W) (TT). When finished there are three polygons, instead of two, but with no common area.

- OVLAP - Inputs to the routine are two sets of points representing two polygons. One set of points is designated the shadow, while the other set is the surface. It is the purpose of this routine to generate, if necessary, a new set or sets of points which represent the portion or portions of the surface which lie outside of the shadow. This routine is used in probability calculation to account for overlap. Referring to Figure 12, the polygon representing the swept area from surface number one would be the shadow while the polygon representing the swept area from surface number two would be the surface. In this case, the output from OVLAP would be two sets of points, representing the two portions of surface lying outside of shadow.
- INTERC - Finds intersections, if any, of a line between two points in a plane with the set of lines given by a set of connected points in the same plane.
- CLOSE - Determines which point in a set of points in a plane is closest to a given point in the same plane.
- CHECK 1 - Determines whether a given point is already contained in a set of points.



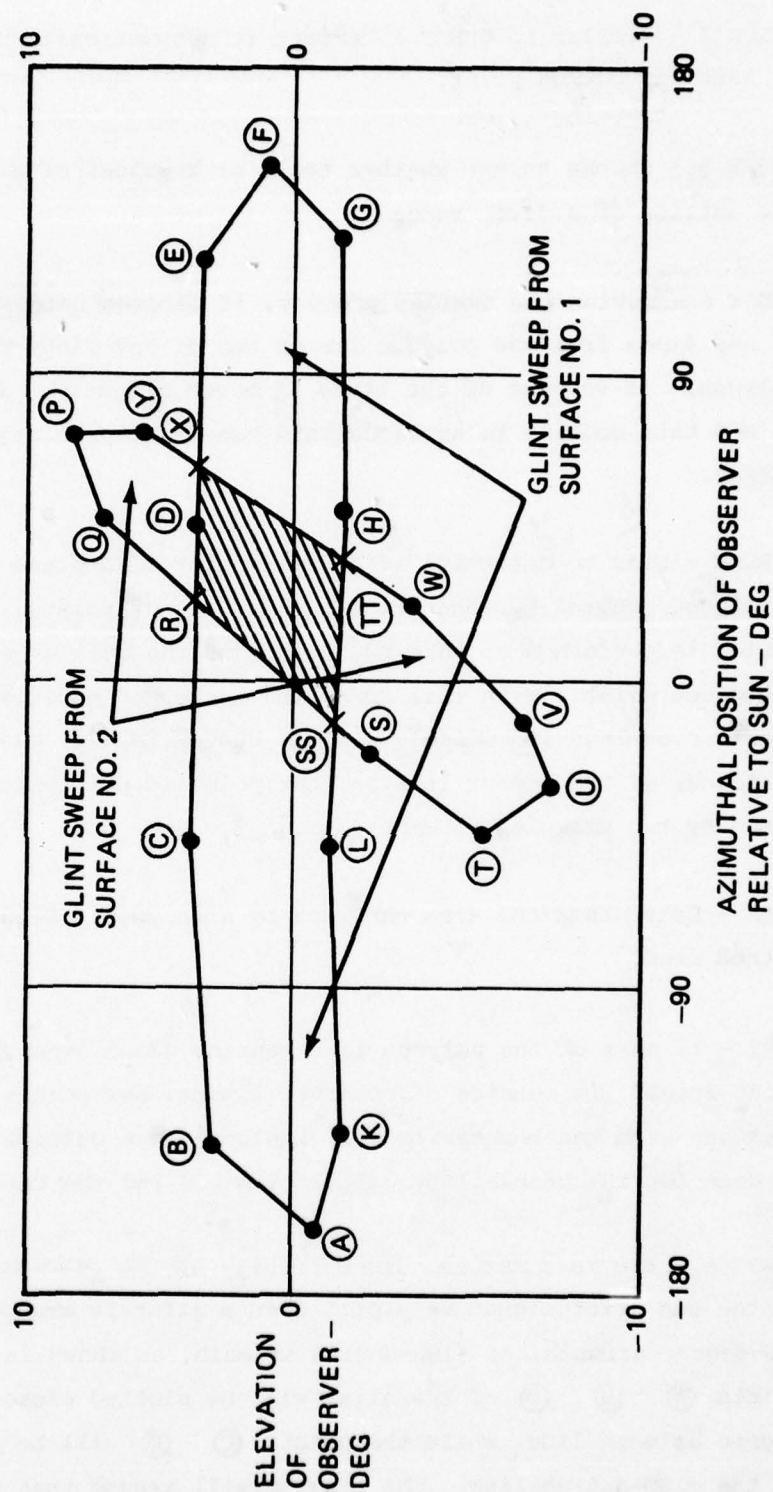
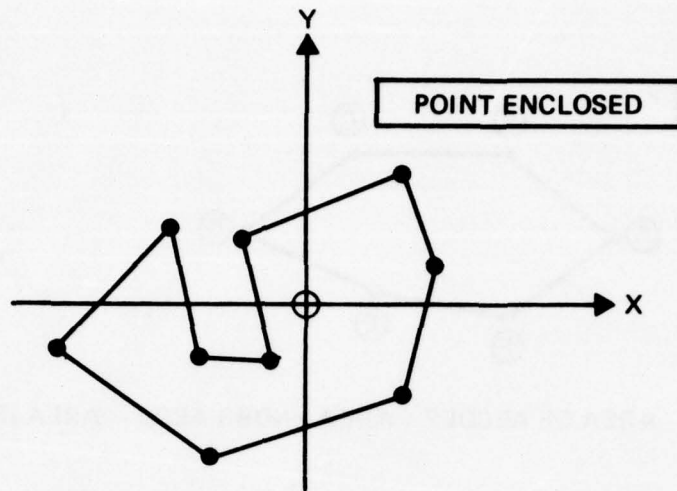
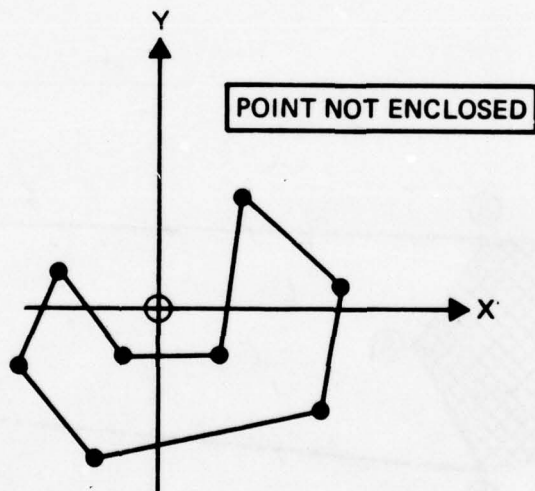


Figure 12. Overlap of Areas Swept by Glints From Two Reflective Surfaces.

- CHECK 2 - Similar to CHECK 1, except it automatically checks a number of sets for common point.
- CHECK 3 - Checks to see whether the X or Y values of a point in a plane are outside of a given range.
- CHECK 4 - During the overlap process, it becomes necessary to check to see if any lines from one polygon lie on top of any lines from the other polygon. If so, one of the lines is moved slightly. It became necessary to add this routine to avoid certain numerical problems in the subroutine OVRLAP.
- CIRCLE - Used to determine if a given point in a plane is enclosed by a polygon created by connecting a given set of points. First, a translation is performed to make the origin of the axis system lie on top of the given point. With this done, the number of positive or negative X-axis crossings is counted. If the number is odd, the point is enclosed; if the number is even, the point is not enclosed. This is shown by two examples in Figure 13.
- AREA - Determines the area enclosed by a polygon. Figure 14 shows the method used.
- SORT - If part of the polygon representing glint sweep, or part of the glint itself, is outside of observer limits, new points at the intersections with the boundaries will replace those outside limits. This is done for the probability calculation and for the CALCOMP plots.
- SORT2 - There is a natural discontinuity at the  $\pm 180$ -degree azimuths on the sun glint signature plot. When a glint is wrapped around the 180-degree azimuth, or -180-degree azimuth, as shown in Figure 15, the points (A) (B) (E) of the glint will be plotted close to the -180-degree azimuth line, while the points (C) (D) will be plotted close to the +180-degree line. The program will assume that the glint (A)



NUMBER OF POSITIVE X CROSSINGS IS 1 (ODD)  
 NUMBER OF NEGATIVE X CROSSINGS IS 3 (ODD)



NUMBER OF POSITIVE X CROSSINGS 2 (EVEN)  
 NUMBER OF NEGATIVE X CROSSINGS 2 (EVEN)

Figure 13. Determination of Point Enclosure.



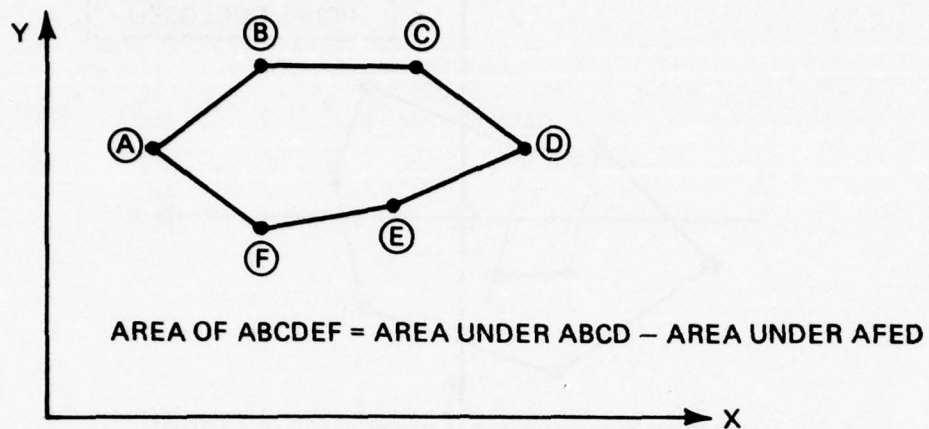


Figure 14. Area Enclosed by Polygon.

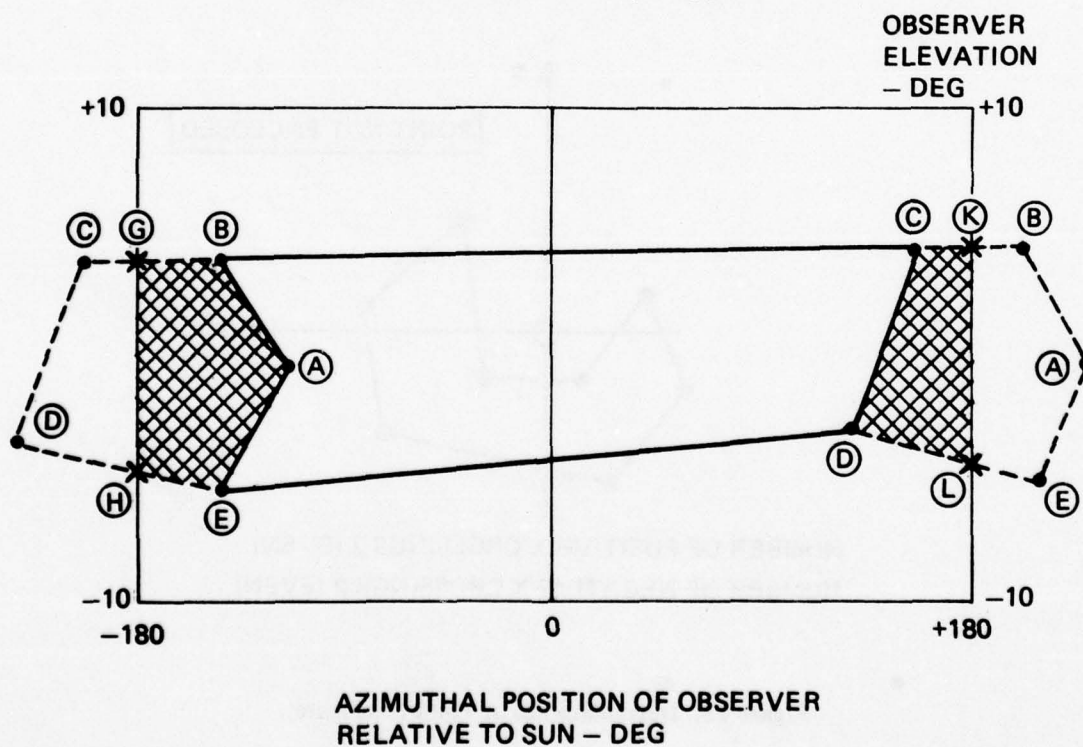


Figure 15. Discontinuity at  $\pm 180$  Degrees Azimuth.

ⓑ ⓒ ⓓ ⓔ is connected as shown with the solid lines. To handle this situation properly, the glint ⓐ ⓑ ⓒ ⓓ ⓔ is replaced with two glints, ⓐ ⓑ ⓖ ⓗ ⓔ and ⓒ ⓓ Ⓚ Ⓛ ⓓ . The new glints are shown shaded in Figure 15. The method employed is to first add 360 degrees to points ⓐ ⓑ ⓔ , moving them to the right as shown. Subroutine SORT is then used to find points Ⓚ Ⓛ . Next, 360 degrees are subtracted from points ⓒ ⓓ , moving them to the left as shown. Subroutine SORT is then used to find points ⓖ ⓗ .

### EQUATIONS USED IN THE PROGRAM

The mathematical expressions used in calculating the sun glint coordinates are presented in this section.

The general form of the equation used to represent all fences is a plane,

$$Ax + By + Cz + D = 0.$$

The general form of the equation used to represent all reflective surfaces is a quadratic surface,

$$Ax^2 + By^2 + Cz^2 + Dxy + Exz + Fyz + Gx + Hy + Kz + L = 0.$$

The sun vector referred to inertial coordinates is of the form

$$\bar{s} = a\bar{i} + b\bar{j} + c\bar{k},$$

where  $(\bar{i}, \bar{j}, \bar{k})$  are unit vectors in the direction of the inertial  $x, y, z$  axes, respectively. The coefficients  $a, b$ , and  $c$  are defined using  $\gamma$ , the sun elevation, as

$$a = -\cos \gamma$$

$$b = 0$$

$$c = -\sin \gamma.$$

The normal to the reflective surface in body axes is

$$\bar{N}_B = N_{B_x} \bar{i}_B + N_{B_y} \bar{j}_B + N_{B_z} \bar{k}_B = \frac{\partial \phi}{\partial x} \bar{i}_B + \frac{\partial \phi}{\partial y} \bar{j}_B + \frac{\partial \phi}{\partial z} \bar{k}_B,$$

where  $(\bar{i}_B, \bar{j}_B, \bar{k}_B)$  are unit vectors in the direction of aircraft body  $x, y, z$  axes, respectively, and the coefficients  $\frac{\partial \phi}{\partial x}$ ,  $\frac{\partial \phi}{\partial y}$ , and  $\frac{\partial \phi}{\partial z}$  are the first partial derivatives of the equation representing the surface.



$$\frac{\partial \phi}{\partial x} = 2Ax + Dy + Ez + G$$

$$\frac{\partial \phi}{\partial y} = 2By + Dx + Fz + H$$

$$\frac{\partial \phi}{\partial z} = 2Cz + Ex + Fy + K.$$

Before the reflection vector can be calculated, the sun vector must be represented in terms of body axes.

$$(S_{x_B}, S_{y_B}, S_{z_B})^T = D (-\cos \gamma, 0, -\sin \gamma)^T$$

where  $(S_{x_B}, S_{y_B}, S_{z_B})$  are the components of the sun vector in body axes and

D is the transformation matrix shown in Figure 4.

The magnitude of the sun vector along the normal to the surface is the projection of the sun vector onto the normal vector. Mathematically, it is the dot product of the sun vector and the normal vector, divided by the magnitude of the normal vector.

$$S_N = \bar{S}_B \cdot \bar{N}_B / |\bar{N}_B|,$$

where  $\bar{S}_B = S_{x_B} \bar{i}_B + S_{y_B} \bar{j}_B + S_{z_B} \bar{k}_B$  and

$$|\bar{N}_B| = \sqrt{N_{B_x}^2 + N_{B_y}^2 + N_{B_z}^2}.$$

Using the value of  $S_N$ , the reflection vector  $\bar{R}_B$  is

$$\bar{R}_B = R_{x_B} \bar{i}_B + R_{y_B} \bar{j}_B + R_{z_B} \bar{k}_B = \bar{S}_B - (2 S_N) \bar{N}_B / |\bar{N}_B|.$$

Transforming the components of the reflection vector from body to inertial axes is done by

$$(R_{x_I}, R_{y_I}, R_{z_I})^T = D^T (R_{x_B}, R_{y_B}, R_{z_B})^T,$$

where  $D^T$  is transpose of the matrix of Figure 4.

Each boundary point of the reflective surface is transformed from body coordinates to inertial coordinates.

$$(x_{S_I}, y_{S_I}, z_{S_I})^T = D^T (x_{S_B}, y_{S_B}, z_{S_B})^T$$

The intersections caused by the line passing through the point  $(x_{S_I}, y_{S_I}, z_{S_I})$  with direction numbers  $(R_{x_I}, R_{y_I}, R_{z_I})$  and the cylinder

$$x^2 + y^2 = R^2,$$

which is the imaginary surface containing the possible observers, are

$(x_{0_1}, y_{0_1}, z_{0_1})$  and  $(x_{0_2}, y_{0_2}, z_{0_2})$ .

$$x_{0_1} = (-b + \sqrt{b^2 - 4ac})/2a$$

$$x_{0_2} = (-b - \sqrt{b^2 - 4ac})/2a$$

$$y_{0_1} = y_{S_I} + (R_{y_I}/R_{x_I}) (x_{0_1} - x_{S_I})$$

$$y_{0_2} = y_{S_I} + (R_{y_I}/R_{x_I}) (x_{0_2} - x_{S_I})$$

$$z_{0_1} = z_{S_I} + (R_{z_I}/R_{x_I}) (x_{0_1} - x_{S_I})$$

$$z_{0_2} = z_{S_I} + (R_{z_I}/R_{x_I}) (x_{0_2} - x_{S_I}),$$

where  $a = 1 + (R_{y_I}/R_{x_I})^2$

$$b = 2y_{S_I} (R_{y_I}/R_{x_I}) - 2x_{S_I} (R_{y_I}/R_{x_I})^2$$

The equations are modified slightly if  $R_{x_I} = 0$ .

The point which lies in the positive direction of the reflection vector is designated  $(x_o, y_o, z_o)$ , and the polar coordinates of this point are

$$\alpha = \tan^{-1} (z_o / \sqrt{x_o^2 + y_o^2})$$

$$\beta = \tan^{-1} (y_o / x_o) ,$$

where  $\alpha$  is the elevation angle and  $\beta$  is the azimuth angle as shown in Figure 5.



### INPUT VARIABLES

The input variables to the computer program are presented in this section.

- TITLE - Title printed at top of each output page.
- DEFLT - Specifies whether default option is to be used during inputting of reflective surface data. The default option reduces the amount of necessary input.

DEFLT = 0 Default option not used

DEFLT = 1 Default option used

- PRINT - Controls how much and what type of data will be printed. Any plots, whether printer plots or CALCOMP plots, will be controlled by another input. Figure 16 shows the results of each option.
- PLOT - Plot options. When plots are requested, a sun glint signature plot for each sun elevation is produced either on CALCOMP plotter or on printer, or both.

PLOT = 0 No plots

PLOT = 1 CALCOMP plots only

PLOT = 2 Print plots only

PLOT = 3 Both CALCOMP and print plots

- PROBL - Specifies whether to calculate probability.

PROBL = 0 Probability calculation bypassed

PROBL = 1 Calculate probability

- THETA - Aircraft pitch attitude in degrees. Positive for nose of aircraft up. Used in forming the inertial-to-body axis transformation shown in Figure 4.

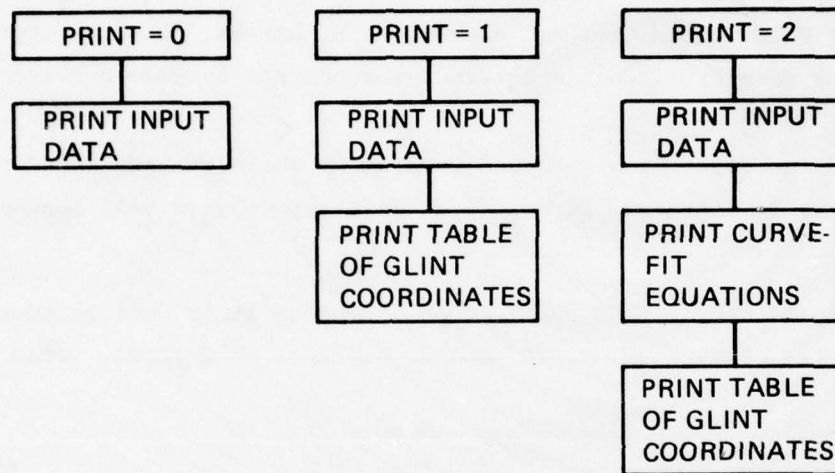


Figure 16. Computer Output From Option PRINT.

- PHI - Aircraft roll attitude in degrees. Positive for right wing down. Used in forming the inertial-to-body axis transformation shown in Figure 4.
- GAMN - Number of different sun elevations to be analyzed. Value should be less than or equal to 9. If not specified, the program assumes a value of 3.
- GAMI - Value of initial sun elevation in degrees. Positive for sun above aircraft. If not specified, the program assumes a value of zero.
- DGAM - Increment by which each successive sun elevation is increased. Value is in degrees. If not specified, the program will assume a value of 30.

Example of use of GAMN, GAMI, DGAM: Suppose it is desired to analyze three sun elevations, 0, 15, and 30 degrees. The inputs would be

GAMN = 3.      GAMI = 0.      DGAM = 15.

- PSIN - Number of different aircraft headings to be analyzed. Value should be less than or equal to 9. If not specified, a value of 9 is assumed by the program.
- PSII - Value of initial aircraft heading (yaw) in degrees. Heading is positive for nose right as shown in Figure 1. A value of -180 degrees is assumed by the program when no value is specified.
- DPSI - Increment by which each successive heading is increased. Value is in degrees. If no value is specified, a value of 45 degrees is used.
- XROT - Station that locates the center of rotation of the aircraft (see Figure 4). Usually the aircraft center of gravity. If not specified, a value of zero is used.
- YROT - Buttline location of the center of rotation. If not specified, a value of zero is used.



- ZROT - Waterline location of the center of rotation. If not specified, a value of zero is used.
- DISTG - Radial distance (feet) in inertial x-y plane from origin of inertial axes to projected glint. This distance is specified as R in Figure 5. If not specified, a value of 1,000 feet is used by the program.
- ELVMIN - Lower limit on elevation angle of possible observers. Value is in degrees. If not specified, a value of -10 degrees is used. ELVMIN is used in probability calculation and lower boundary on sun glint signature plots. Value cannot be less than -90 degrees.
- ELVMAX - Upper limit on elevation angle of possible observers. Value is in degrees. If not specified, a value of 10 degrees is used. ELVMAX is used in probability calculation and upper boundary on sun glint signature plot. Value cannot be greater than 90 degrees.
- AZMMIN - Minimum allowable azimuth angle to observer, in degrees. If not specified, a value of -180 degrees is used. AZMMIN is the boundary on the left of the sun glint signature plot. Value cannot be less than -180 degrees.
- AZMMAX - Maximum allowable azimuth angle to observer, in degrees. If not specified, a value of 180 degrees is used. AZMMAX is the boundary on the right of the sun glint signature plot. Value cannot be greater than 180 degrees.
- FENCES - Number of fences. Maximum number is 10.
- PANELS - Number of reflective (transparency) panels. Maximum number is 12.
- FPTS - Number of boundary points on a fence. Maximum value is 10.
- XFPT - Station for a fence boundary point.
- YFPT - Buttline for a fence boundary point.

- ZFPT - Waterline for a fence boundary point.
- TITLES - Transparency (reflective) surface identification.
- SYMTRY - Specifies whether the transparency surface just identified is symmetric to the surface, whose data has just been read in. This option will be made clearer with the sample cases in Appendix A. The possible values for SYMTRY are:

SYMTRY = 0. Not symmetric to previous surface and therefore data for this surface is necessary.

SYMTRY = 1. Symmetry is about x-z plane.

SYMTRY = 2. Symmetry is about x-y plane.

SYMTRY = 3. Symmetry is about y-z plane.

If SYMTRY  $\neq$  0, then the following variables are not necessary for this reflective surface.

The variables XFIT, YFIT, ZFIT, XYFIT, XZFIT, YZFIT, XSQFIT, YSQFIT, ZSQFIT, XCOF, YCOF, ZCOF, XYCOF, XZCOF, YZCOF, XSQCOF, YSQCOF, ZSQCOF, and CTERM are used only if DEFLT = 0. With these variables, the program user may either specify which terms in the general quadratic equation he wishes to use in the curve-fit routine, or he may specify the actual values for these coefficients.

- XFIT - Should the linear x term in the quadratic equation be used in the curve-fit analysis of this surface?

XFIT = 0. No

XFIT = 1. Yes

- YFIT - Should the linear y term in the quadratic equation be used in the curve-fit analysis of this surface?

YFIT = 0. No

YFIT = 1. Yes

- ZFIT - Should the linear z term in the quadratic equation be used in the curve-fit analysis of this surface?

ZFIT = 0. No

ZFIT = 1. Yes

- XYFIT - Should the quadratic xy term in the quadratic equation be used in the curve-fit analysis of this surface?

XYFIT = 0. No

XYFIT = 1. Yes

- XZFIT - Should the quadratic xz term in the quadratic equation be used in the curve-fit analysis of this surface?

XZFIT = 0. No

XZFIT = 1. Yes

- YZFIT - Should the quadratic yz term in the quadratic equation be used in the curve-fit analysis of this surface?

YZFIT = 0. No

YZFIT = 1. Yes

- XSQFIT - Should the quadratic  $x^2$  term in the quadratic equation be used in the curve-fit analysis of this surface?

XSQFIT = 0. No

XSQFIT = 1. Yes

- YSQFIT - Should the quadratic  $y^2$  term in the quadratic equation be used in the curve-fit analysis?

YSQFIT = 0. No

YSQFIT = 1. Yes

- ZSQFIT - Should the quadratic  $z^2$  term in the quadratic equation be used in the curve-fit analysis?

ZSQFIT = 0. No

ZSQFIT = 1. Yes

- XCOF - If a nonzero value is read in for XCOF, then the value for XCOF will be used for the coefficient of x in the quadratic equation representing this reflective surface. XFIT must be set to one when XCOF is used.
- YCOF - If a nonzero value is read in for YCOF, then the value for YCOF will be used for the coefficient of y in the quadratic equation representing this reflective surface. YFIT must be set to one when YCOF is used.
- ZCOF - If a nonzero value is read in for ZCOF, then the value for ZCOF will be used for the coefficient of z in the quadratic equation representing this reflective surface. ZFIT must be set to one when ZCOF is used.
- XYCOF - If a nonzero value is read in for XYCOF, then the value for XYCOF will be used for the coefficient of xy in the quadratic equation representing this reflective surface. XYFIT must be set to one when XYCOF is used.
- XZCOF - If a nonzero value is read in for XZCOF, then the value for XZCOF will be used for the coefficient of xz in the quadratic equation representing this reflective surface. XZFIT must be set to one when XZCOF is used.



- XSQCOF - If a nonzero value is read in for XSQCOF, the value for XSQCOF will be used for the coefficient of  $x^2$  in the quadratic equation representing this reflective surface. XSQFIT must be set to one when XSQCOF is used.
- YSQCOF - If a nonzero value is read in for YSQCOF, the value for YSQCOF will be used for the coefficient of  $y^2$  in the quadratic equation representing this reflective surface. YSQFIT must be set to one when YSQCOF is used.
- ZSQCOF - If a nonzero value is read in for ZSQCOF, the value for ZSQCOF will be used for the coefficient of  $z^2$  in the quadratic equation representing the reflective surface. ZSQFIT must be set to one when ZSQCOF is used.
- CTERM - If a nonzero value is read in for CTERM, the value for CTERM will be used for the constant term in the quadratic equation for this reflective surface.
- RPTS - Number of boundary points on reflective surface. Maximum value is 30.
- XSPT - Station for a reflective surface boundary point.
- YSPT - Buttline for a reflective surface boundary point.
- ZSPT - Waterline for a reflective surface boundary point.

Fifty-one input parameters have been defined, but the actual number of inputs depends on the particular case. The arrangement of the input parameters on data cards for a configuration consisting of two fences and two reflective surfaces is shown in Figure 17. The first fence has three boundary points and the second fence has four. The two reflective surfaces are symmetric about the x-z plane and are defined by four boundary

COLUMN		COLUMN					
1		80					
TITLE							
1	11	21	31	41	51	60	80
DEFLT*	PRINT	THETA	PHI				
1	11	21	31	41	51	60	80
GAMN	GAMI	DGAM	PSIN	PSII	DPSI		
1	11	21	31	41	51	60	80
XROT	YROT	ZROT					
1	11	21	31	41	51	60	80
DISTG	ELVMIN	ELVMAX	AZMMIN	AZMMAX			
1	11	21	31	41	51	60	80
FENCES	PANELS	PLOT	PROBL				
1	11	21	31	41	51	60	80
FPTS							
FIRST FENCE							
1	11	21	31	41	51	60	80
XFPT(1)	YFPT(1)	ZFPT(1)	XFPT(2)	YFPT(2)	ZFPT(2)		
1	11	21	31	41	51	60	80
XFPT(3)	YFPT(3)	ZFPT(3)					
SECOND FENCE							
1	11	21	31	41	51	60	80
FPTS							
1	11	21	31	41	51	60	80
XFPT(1)	YFPT(1)	ZFPT(1)	XFPT(2)	YFPT(2)	ZFPT(2)		
1	11	21	31	41	51	60	80
XFPT(3)	YFPT(3)	ZFPT(3)	XFPT(4)	YFPT(4)	ZFPT(4)		
TITLES							
1	11	21	31	41	51	60	80
SYMTRY*							
** THESE CARDS OMITTED IF DEFAULT OPTION USED							
1	11	21	31	41	51	60	80
XFIT	YFIT	ZFIT	XYFIT	XZFIT	YZFIT		
1	11	21	31	41	51	60	80
XSQFIT	YSQFIT	ZSQFIT					
1	11	21	31	41	51	60	80
XCOF	YCOF	ZCOF	XYCOF	XZCOF	YZCOF		
1	11	21	31	41	51	60	80
XSQCOF	YSQCOF	ZSQCOF	CTERM				
1	11	21	31	41	51	60	80
RPTS							
FIRST REFLECTIVE SURFACE							
1	11	21	31	41	51	60	80
XSPT(1)	YSPT(1)	ZSPT(1)	XSPT(2)	YSPT(2)	ZSPT(2)		
1	11	21	31	41	51	60	80
XSPT(3)	YSPT(3)	ZSPT(3)	XSPT(4)	YSPT(4)	ZSPT(4)		
1	11	21	31	41	51	60	80
XSPT(5)	YSPT(5)	ZSPT(5)					
SECOND REFLECTIVE SURFACE							
1	TITLES						
1	11	21	31	41	51	60	80
SYMTRY*							

\* FOR THIS SETUP  
 DEFLT = 0.  
 SYMTRY = 0. (FIRST REFLECTIVE SURFACE)

SYMTRY = 1. (SECOND REFLECTIVE SURFACE)  
 \*\* DEFLT = 1.

Figure 17. Input Data Scheme.

points. The default option will not be used in reading in the reflective surface data; however, the comments show which cards are omitted if the default option is used.

### GENERATED SYMBOLS

The symbolic names for the variables of interest which are assigned values during the execution of the program are presented in this section.

- COEFFB - Array containing the coefficients of the equations representing the fences.
- COEFSB - Array containing the coefficients of the equations representing the reflective surfaces.
- SIGF - Array containing the root-mean-square estimate of the error for each fence curve-fit.
- SIGS - Array containing the root-mean-square estimate of the error for each reflective surface curve-fit.
- GAMMA - Sun elevation angle. Takes on values specified by the inputs GAMN, GAMI, and DGAM.
- ALPHA2 - Array containing the elevation angles for all the sun glints generated.
- BETA2 - Array containing the azimuth angles for all the sun glints generated.
- INTRFL - Array containing a set of condition flags. Each flag records whether a particular set of sun glint coordinates was generated by an internal reflection.
  - INTRFL = 0 External reflection
  - INTRFL = 1 Internal reflection



- ISHADW - Array containing a set of condition flags. Each flag records whether a particular set of sun glint coordinates was generated from a boundary point in the shadow of a fence.  
     ISHADW = 0   Boundary point not in shadow  
     ISHADW = 1   Boundary point in shadow
  
- INTERF - Array containing a set of condition flags. Each flag records whether a particular set of sun glint coordinates was generated by a reflection vector which intersected a fence.  
     INTERF = 0   No intersection with fence  
     INTERF = 1   Reflection vector blocked by a fence
  
- APLOT - Array containing the minimum and maximum elevation angles which were formed at each aircraft heading.
  
- BPLOT - Array containing the minimum and maximum azimuth angles which were formed at each aircraft heading.
  
- SUN - Three-dimensional array containing the coordinates of the unit sun vector in inertial axes.
  
- SUNB - Three-dimensional array containing the coordinates of the unit sun vector in aircraft body axes.
  
- DIRCOS - Three-by-three matrix containing the orthonormal transformation shown in Figure 4 used to transform coordinates of a vector from inertial to body axes.
  
- XB - Coordinates of a reflective surface boundary point in body axes.  
     Array is redefined for each boundary point being analyzed.
  
- X - Coordinates of a reflective surface boundary point in inertial axes.
  
- VNORMB - Coordinates of normal to reflective surface.

- RFLTN - Coordinates of reflection vector referred to inertial axes.
- XPLOT - Array of azimuthal values of points forming the polygon representing the area swept by glints from a reflective surface.
- YPLOT - Array of elevation angles for points forming the polygon representing the area swept by glints from a reflective surface.
- SWEEP - Area swept by the sun glints from all the reflective surfaces, ignoring overlap.
- SWA2 - Area swept by the sun glints from all the reflective surfaces, counting the overlap area only once.
- TAREA - Total possible area of sun glint signature plot.
- VPROBL - Value of probability calculation. SWA2 divided by TAREA.

## OUTPUT

The output from the program is broken up into five sections and controlled by the input variables PRINT and PLOT as defined previously. The five types of output are:

- Input data
- Curve-fit results
- Tabular sun glint results
- Sun glint signature plots using printer
- Sun glint signature plots using CALCOMP plotter.

The printout of the input data is just a feedout of the data read in from cards. Sheet 1 of Figure 18 shows the first page of this type output. The first group of input data is printed out under the caption **\*\*CONTROL OPTIONS**. The input parameters presented are DEFLT, PRINT, PLOT, and PROBL, respectively. The second group of input data comes under the caption **\*\*AIRCRAFT INITIAL EULER ORIENTATION**. The input parameters printed are THETA, PHI, AND PSII. Under the third and fourth captions, **\*\*SELECTED YAW ANGLE ROTATIONS** and **\*\*SELECTED SUN ELEVATIONS**, are printed the values for the variables PSIN, PSII, DPSI, and GAMN, GAMI, DGAM, respectively. The fifth set of information, **\*\*REFERENCE INFORMATION FOR MEASURING SUN GLINT ANGLES**, in the printout of XROT, YROT, ZROT, and DISTG. The sixth and seventh sets of information, **\*\*PLOT SCALING**, and **\*\*BOUNDARIES FOR CALCULATING PROBABILITY**, are printouts of the same variables, AZMMIN, AZMMAX, ELVMIN, and ELVMAX. They are printed out twice, under different titles, to show that the same values are used in both places. Sheet 2 of Figure 18 is a printout of the fence input data. The number of fences (FENCES), the number of boundary points (FPTS), and the location of each boundary point (XFPT, YFPT, ZFPT) are printed out. Sheet 3 of Figure 18 shows how the input data for a reflection surface is output. Under **\*\*REFLECTIVE SURFACES DATA**, the number of reflective panels (PANELS) is printed. Then, for each reflective surface, an identification title (TITLES), preselected curve-fit terms (XFIT, YFIT, ZFIT, XYFIT, XZFIT, YZFIT, XSQFIT, YSQFIT, ZSQFIT),

*** INPUT DATA ***									
**CONTROL OPTIONS									
DEFAULT OPTION	0.	PRINT OPTION	2.						
PLOT OPTION	1.	PROBABILITY DPI	1.						
**AIRCRAFT INITIAL EULER ORIENTATION									
PITCH	-3.0	ROLL	0.0	YAW	0.0				
**SELECTED YAW ANGLE ROTATIONS									
NO. OF ANGLES	2.	INITIAL ANGLE	0.0	ANGLE INCREMENT	20.0				
**SELECTED SUN ELEVATIONS									
NO. OF ANGLES	3.	INITIAL ANGLE	0.0	ANGLE INCREMENT	30.0				
**REFERENCE INFORMATION FOR MEASURING SUN GLINT ANGLES									
REFERENCE POINT FOR MEASURING ANGLES OF GLINT SIGNATURE	2.								
	0.0	0.0	0.0	DISTANCE AT WHICH GLINT SIGNATURE FORMED (FT.)					
**PLOT SCALING									
GLINT AZIMUTH	-180.0	GLINT ELEVATION	-10.0						
MINIMUM	180.0	MINIMUM	10.0						
MAXIMUM		MAXIMUM							
**BOUNDARIES FOR CALCULATING PROBABILITY									
GLINT AZIMUTH	-180.0	GLINT ELEVATION	-10.0						
MINIMUM	180.0	MINIMUM	10.0						
MAXIMUM		MAXIMUM							

Figure 18. Typical Printout of Input Data (Sheet 1 of 3).



*** INPUT DATA ***									
**FENCE DATA		NO. OF FENCES		1.					
*FENCE NO. 1		NUMBER OF POINTS		4.					
BOUNDARY POINTS		-- BODY AXES		(STATIONLINE,BUTLINE,WATERLINE)					
	X	Y	Z	X	Y	Z	X	Y	Z
( 1 )	-158.84	0.0	-12.00	( 2 )	-132.00	0.0	22.56	0.0	22.56
( 4 )	-88.00	0.0	-12.00						

*** INPUT DATA ***																																				
**REFLECTIVE SURFACE DATA																																				
NO. OF SURFACES 4.																																				
*REFLECTIVE SURFACE NO. 1 IDENTIFICATION: WINDSHIELD																																				
CURVE-FIT INPUT DATA																																				
DESIRED TERMS FOR CURVE-FITTING																																				
(1) X TERM	1.	(2) Y TERM	1.	(3) Z TERM	1.	(4) XY TERM	0.	(5) XZ TERM	0.																											
(6) YZ TERM	0.	(7) XSQ TERM	0.	(8) YSQ TERM	0.	(9) ZSQ TERM	0.																													
INPUT VALUES FOR COEFFICIENTS OF SURFACE																																				
(1) X COEF	0.0	(2) Y COEF	0.0	(3) Z COEF	0.0																															
(4) XY COEF	0.0	(5) XZ COEF	0.0	(6) YZ COEF	0.0																															
(7) XSQ COEF	0.0	(8) YSQ COEF	0.0	(9) ZSQ COEF	0.0																															
(10) CONSTANT	0.0																																			
BOUNDARY POINTS -- BODY AXES (STATIONLINE+OUTLINE+WATERLINE)																																				
(1) X	-153.44	(2) Y	-18.00	(3) Z	-12.00	(4) X	18.00	(5) Y	-12.00	(6) Z	16.56																									
(4) X	-132.00	(5) Y	-18.00	(6) Z	16.56																															
*REFLECTIVE SURFACE NO. 2 IDENTIFICATION: TOP PANEL																																				
CURVE-FIT INPUT DATA																																				
DESIRED TERMS FOR CURVE-FITTING																																				
(1) X TERM	1.	(2) Y TERM	1.	(3) Z TERM	1.	(4) XY TERM	0.	(5) XZ TERM	0.																											
(6) YZ TERM	0.	(7) XSQ TERM	0.	(8) YSQ TERM	0.	(9) ZSQ TERM	0.																													
INPUT VALUES FOR COEFFICIENTS OF SURFACE																																				
(1) X COEF	0.0	(2) Y COEF	0.0	(3) Z COEF	0.0																															
(4) XY COEF	0.0	(5) XZ COEF	0.0	(6) YZ COEF	0.0																															
(7) XSQ COEF	0.0	(8) YSQ COEF	0.0	(9) ZSQ COEF	0.0																															
(10) CONSTANT	0.0																																			
BOUNDARY POINTS -- BODY AXES (STATIONLINE+OUTLINE+WATERLINE)																																				
(1) X	-152.00	(2) Y	-18.00	(3) Z	-132.00	(4) X	18.00	(5) Y	16.56	(6) Z	16.56																									
(4) X	-48.00	(5) Y	-18.00	(6) Z	16.56																															
*REFLECTIVE SURFACE NO. 3 IDENTIFICATION: LEFT FORWARD SIDE PANEL																																				
CURVE-FIT INPUT DATA																																				
DESIRED TERMS FOR CURVE-FITTING																																				
(1) X TERM	1.	(2) Y TERM	1.	(3) Z TERM	1.	(4) XY TERM	0.	(5) XZ TERM	0.																											
(6) YZ TERM	0.	(7) XSQ TERM	0.	(8) YSQ TERM	0.	(9) ZSQ TERM	0.																													
INPUT VALUES FOR COEFFICIENTS OF SURFACE																																				
(1) X COEF	0.0	(2) Y COEF	0.0	(3) Z COEF	0.0																															
(4) XY COEF	0.0	(5) XZ COEF	0.0	(6) YZ COEF	0.0																															
(7) XSQ COEF	0.0	(8) YSQ COEF	0.0	(9) ZSQ COEF	0.0																															
(10) CONSTANT	0.0																																			
BOUNDARY POINTS -- BODY AXES (STATIONLINE+OUTLINE+WATERLINE)																																				
(1) X	-152.00	(2) Y	-18.00	(3) Z	-132.00	(4) X	18.00	(5) Y	16.56	(6) Z	16.56																									
(4) X	-48.00	(5) Y	-18.00	(6) Z	16.56																															

Figure 18. Typical Printout of Input Data (Sheet 3 of 3).

preselected curve-fit coefficients (XCOF, YCOF, ZCOF, XYCOF, XZCOF, YZCOF, XSQCOF, YSQCOF, ZSQCOF, CTERM), and boundary points are printed.

The second type of output is the result of curve-fitting the boundary points of each fence and reflective surface. Sheet 1 of Figure 19 shows the coefficients of the plane best approximating the boundary points of the fence. For the case shown, the equation would be  $0.01476y = 0$  or just  $y = 0$ , which is the equation of the x-z plane. Sheet 2 of Figure 19 shows the coefficients of several quadratic equations approximating several reflective surfaces. For the case shown, the equation for the first surface is a plane,  $-0.006923x + 0.005206z - 1 = 0$ .

The third type of output is the tabular sun glint results. Each table represents the results for one reflective surface at constant sun elevation as aircraft heading changes. Part of a typical table is shown in Figure 20. At the top of the page, the reflective surface is identified. Next, the sun elevation, aircraft pitch and roll attitude, location of aircraft center of rotation, and radial distance to observers are printed. Then, for each aircraft heading, each boundary point is listed along with three condition flags and the point on the sun glint resulting from the reflection from this boundary point. The condition flags INRFL, ISHAD, and INTRF specify whether the reflection from this boundary point is internal, whether the boundary point lies in a shadow, or whether the reflection vector from this boundary point intersects a fence. A value of zero means no while a one means yes.

The fourth type of output is a print plot of a sun glint signature, as shown in Figure 21. Each plot is for a constant sun elevation. The values that are plotted are the minimum and maximum azimuths and elevations for each sun glint resulting from each reflective surface at each aircraft heading analyzed. Each letter, as the legend below the plot shows, is for a constant aircraft heading and may have resulted from more than one surface. The probability as previously defined is also shown in the right-hand corner below the plot.





\*\*\* RESULTS OF CURVE-FIT ANALYSIS \*\*\*

REFLECTIVE SURFACE DATA

REFLECTIVE SURFACE NO. 1 IDENTIFICATION: WINDSHIELD

VALUES FOR COEFFICIENTS OF SURFACE

(1) X	COEF	-0.6723E-02	(2) Y	COEF	0.0	(3) Z	COEF	0.5206E-02
(4) XY	COEF	0.0	(5) XZ	COEF	0.0	(6) YZ	COEF	0.0
(7) XSO	COEF	0.0	(8) YSO	COEF	0.0	(9) ZSO	COEF	0.0
(10)	CONSTANT	-0.1000E 01						

ROOT MEAN SQUARE ERROR OF FIT= 0.1600E-15

REFLECTIVE SURFACE NO. 2 IDENTIFICATION: TOP PANEL

VALUES FOR COEFFICIENTS OF SURFACE

(1) X	COEF	-0.2820E-17	(2) Y	COEF	0.0	(3) Z	COEF	0.6039E-01
(4) XY	COEF	0.0	(5) XZ	COEF	0.0	(6) YZ	COEF	0.0
(7) XSO	COEF	0.0	(8) YSO	COEF	0.0	(9) ZSO	COEF	0.0
(10)	CONSTANT	-0.1000E 01						

ROOT MEAN SQUARE ERROR OF FIT= 0.1178E-15

REFLECTIVE SURFACE NO. 3 IDENTIFICATION: LEFT FORWARD SIDE PANEL

VALUES FOR COEFFICIENTS OF SURFACE

(1) X	COEF	-0.2007E-15	(2) Y	COEF	-0.5556E-01	(3) Z	COEF	0.7201E-16
(4) XY	COEF	0.0	(5) XZ	COEF	0.0	(6) YZ	COEF	0.0
(7) XSO	COEF	0.0	(8) YSO	COEF	0.0	(9) ZSO	COEF	0.0
(10)	CONSTANT	-0.1000E 01						

ROOT MEAN SQUARE ERROR OF FIT= 0.1721E-14

REFLECTIVE SURFACE NO. 4 IDENTIFICATION: LEFT AFT SIDE PANEL

VALUES FOR COEFFICIENTS OF SURFACE

(1) X	COEF	0.3296E-17	(2) Y	COEF	-0.5556E-01	(3) Z	COEF	-0.5634E-18
(4) XY	COEF	0.0	(5) XZ	COEF	0.0	(6) YZ	COEF	0.0
(7) XSO	COEF	0.0	(8) YSO	COEF	0.0	(9) ZSO	COEF	0.0
(10)	CONSTANT	-0.1000E 01						

ROOT MEAN SQUARE ERROR OF FIT= 0.1695E-15

Figure 19. Typical Printout of Curve-Fit Results (Sheet 2 of 2).

*** SUN GLINT SIGNATURE ***									
REFLECTIVE SURFACE NO. 1 IDENTIFICATION: WINDSHIELD									
SUN ELEVATION	68.00								AREF 0.0
A/C PITCH ATTITUDE	-4.00								YREF 0.0
A/C ROLL ATTITUDE	0.0								ZREF 0.0
									DIS19 65.00
A/C YAW	BOUNDARY POINTS -- BODY AXES		STATUS FLAGS FOR POINTS		GLINT				
	(STATION)LINE	BUFILELINE	INREL	ISNAD	INTRE	ELEVATION	AZIMUTH		
0.0	-153.48	-18.00	-12.00	0	0	0	3.05	-1.34	
0.0	-153.48	18.00	-12.00	0	0	0	3.05	1.34	
0.0	-132.00	18.00	16.56	0	0	0	5.42	1.34	
0.0	-132.00	-18.00	16.56	0	0	0	5.42	-1.34	
20.00	-153.48	-18.00	-12.00	0	0	0	1.79	26.60	
20.00	-153.48	18.00	-12.00	0	0	0	1.77	29.25	
20.00	-132.00	18.00	16.56	0	0	0	4.18	29.50	
20.00	-132.00	-18.00	16.56	0	0	0	4.13	26.05	
40.00	-153.48	-18.00	-12.00	0	0	0	-1.00	53.82	
40.00	-153.48	18.00	-12.00	0	0	0	-1.00	56.37	
40.00	-132.00	18.00	16.56	0	0	0	0.35	56.03	
40.00	-132.00	-18.00	16.56	0	0	0	0.35	54.29	
60.00	-153.48	-18.00	-12.00	0	0	0	-7.63	79.70	
60.00	-153.48	18.00	-12.00	0	0	0	-7.51	82.13	
60.00	-132.00	18.00	16.56	0	0	0	-5.47	82.76	
60.00	-132.00	-18.00	16.56	0	0	0	-5.60	80.34	
80.00	-153.48	-18.00	-12.00	0	0	0	-14.90	103.01	
80.00	-153.48	18.00	-12.00	0	0	0	-14.60	106.13	
80.00	-132.00	18.00	16.56	0	0	0	-12.92	106.88	
90.00	-132.00	-18.00	16.56	0	0	0	-13.24	104.56	

Figure 20. Typical Printout of Tabular Sun Glint Results.

SUN BLIND SIGNATURE									
SUN ELEVATION	SUN ELEVATION	SUN ELEVATION	SUN ELEVATION	SUN ELEVATION	SUN ELEVATION	SUN ELEVATION	SUN ELEVATION	SUN ELEVATION	SUN ELEVATION
A/C PITCH ATTITUDE	A/C PITCH ATTITUDE	A/C PITCH ATTITUDE	A/C PITCH ATTITUDE	A/C PITCH ATTITUDE	A/C PITCH ATTITUDE	A/C PITCH ATTITUDE	A/C PITCH ATTITUDE	A/C PITCH ATTITUDE	A/C PITCH ATTITUDE
A/C ROLL ATTITUDE	A/C ROLL ATTITUDE	A/C ROLL ATTITUDE	A/C ROLL ATTITUDE	A/C ROLL ATTITUDE	A/C ROLL ATTITUDE	A/C ROLL ATTITUDE	A/C ROLL ATTITUDE	A/C ROLL ATTITUDE	A/C ROLL ATTITUDE
OBSERVER ANGLE	OBSERVER ANGLE	OBSERVER ANGLE	OBSERVER ANGLE	OBSERVER ANGLE	OBSERVER ANGLE	OBSERVER ANGLE	OBSERVER ANGLE	OBSERVER ANGLE	OBSERVER ANGLE
DEGREES	DEGREES	DEGREES	DEGREES	DEGREES	DEGREES	DEGREES	DEGREES	DEGREES	DEGREES
10.000	A	10.000	A	10.000	A	10.000	A	10.000	A
5.000	I	5.000	I	5.000	I	5.000	I	5.000	I
0.0	A	0.0	A	0.0	A	0.0	A	0.0	A
-5.000	I	-5.000	I	-5.000	I	-5.000	I	-5.000	I
-10.000	I	-10.000	I	-10.000	I	-10.000	I	-10.000	I
AZIMUTHAL POSITION OF OBSERVER - DEGREES									
-10.000	-10.000	-10.000	-10.000	-10.000	-10.000	-10.000	-10.000	-10.000	-10.000
-10.000	-10.000	-10.000	-10.000	-10.000	-10.000	-10.000	-10.000	-10.000	-10.000
PROBABILITY: 0.215									
KEY TO PLOT SYMBOLS									
SYMBOL	A/C HEADING (DEG)	SYMBOL	A/C HEADING (DEG)	SYMBOL	A/C HEADING (DEG)	SYMBOL	A/C HEADING (DEG)	SYMBOL	A/C HEADING (DEG)
A	0.0	F	100.00	F	100.00	F	100.00	F	100.00
B	20.00	G	120.00	G	120.00	G	120.00	G	120.00
C	40.00	H	140.00	H	140.00	H	140.00	H	140.00
D	60.00	I	160.00	I	160.00	I	160.00	I	160.00
E	80.00								

The fifth and final type of output comes from a CALCOMP plotter. It is, as can be seen from Figure 22, a continuous plot. As was the case for the print plots, each CALCOMP plot is the total sun glint signature of the configuration at a constant sun elevation. The aircraft headings are shown on the plots as near as possible to the sun glint they represent. However, when more than one surface produces a glint in the same area, as in the bottom plot, the values are sometimes printed on top of each other. This nuisance has not been corrected yet but should cause no problems, since the numbers can still be distinguished.

The plotter should be started with the pen origin at 0,0 or Lower Left.



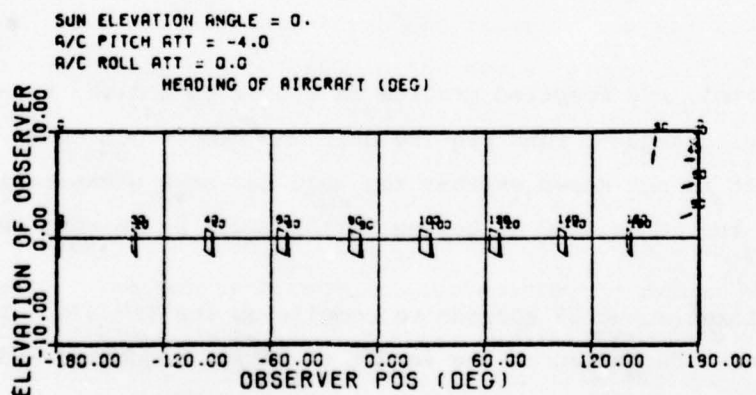
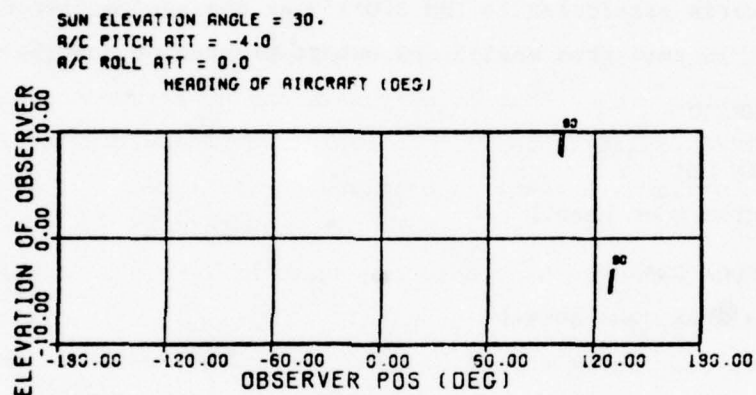
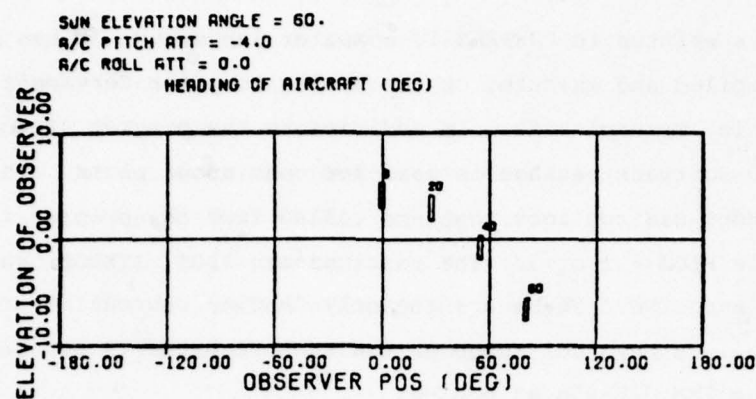


Figure 22. Typical CALCOMP Plot.

### RUNNING INSTRUCTIONS

The program is written in FORTRAN IV computer language. It has been successfully compiled and executed on the Boeing Computer Service's IBM 370-158 at Philadelphia, Pennsylvania. In addition to the program itself, the CALCOMP Basic Software package is used for continuous plots. This CALCOMP package includes six routines that are called from the program if the input variable PLOT = 1 or 3. The routines are PLOT, SYMBOL, NUMBER, SCALE, AXIS, and LINE. These are the only CALCOMP subroutines required. The following is a physical setup of the deck required to compile and execute on the IBM 370-158 at Boeing.

```
// JCL cards particular to IBM 370-158 at Boeing Computer Services.  
    Input is read from unit 5 and output printed on unit 6.  
  
//EXEC COMP2GO  
  
//FTC.SYSIN DD*  
    (Program goes here.)  
  
//GØ.FT05F001 DD*  
    (Data deck goes here.)  
  
/*  
  
//
```

At Boeing Vertol, the compiled program is stored on a disk; therefore, once compiled, any subsequent runs require only the proper JCL cards and the data deck. It is not known whether the user has such a capability, so any reference to the JCL's used at Boeing Vertol could be meaningless.

The program takes about 35 seconds to compile on the IBM 370. Typical execution times, depending on the amount of output requested and the number of conditions analyzed, are approximately 8 to 12 seconds.

As for the form of the input, all titles are read using an alphanumeric format, which allows for the mixing of letters and numbers in the input. The rest of the inputs are read using a floating-point format with 10

columns allotted for each variable. As long as the decimal point is included, the variable may appear anywhere in those 10 columns. The specific location of each variable on the card was shown in Figure 17.

APPENDIX A  
SAMPLE CASES

Two sample cases will be discussed to demonstrate the use of the program. The first example deals with the configuration shown in Figure A-1. The panels are all flat. There are six panels, four of them being identified in the isometric. The right-forward and the right-aft panels are hidden from view. The right-forward panel is symmetric to the left-forward panel about the x-z plane of the aircraft. Likewise the right-aft panel is symmetric to the left-aft panel about the x-z plane of the aircraft. There are two fences on the canopy, one over the windshield while the other is over the top panel. Since the surfaces are all flat, as few as three points can be used to locate the boundaries of the surface. The circled letters represent the boundary points selected. In practice, more boundary points may be selected; however, in most cases of flat panels a large number of boundary points is not necessary. Using the three-view drawing shown, the center of rotation and each circled letter can be located referenced to the station, buttline, waterline axes. The panels and fences can then be described by a set of locations as tabulated in Table A-1. For instance, the windshield is defined by the locations of (A) (B) (C) (D) . These are the boundary points that are used by the program.

With the panels and fences defined and the location of the center of rotation known, the next step is to decide on what conditions to analyze. Using Figure 17 as a guide, the first input card would contain the title for this run. The title chosen is FLAT PANELS WITH FENCES SAMPLE CASE I, which will appear on the first card. The second card contains the input variables, DEFLT, PRINT, THETA, and PHI. The default option is chosen (DEFLT = 1.); therefore the optional cards shown in Figure 17 will be omitted. Since all the printout possible is desired, PRINT will be set equal to 2. The aircraft pitch and roll attitudes will be assumed to be zero (THETA = 0. and PHI = 0.). This takes care of the second card. The third card will specify the desired sun elevations and aircraft headings (GAMN, GAMI, DGAM, PSIN, PSII, DPSI). Three sun elevations are chosen, 0, 30, and 60 degrees. Therefore, GAMN will be equal to 3., GAMI will be



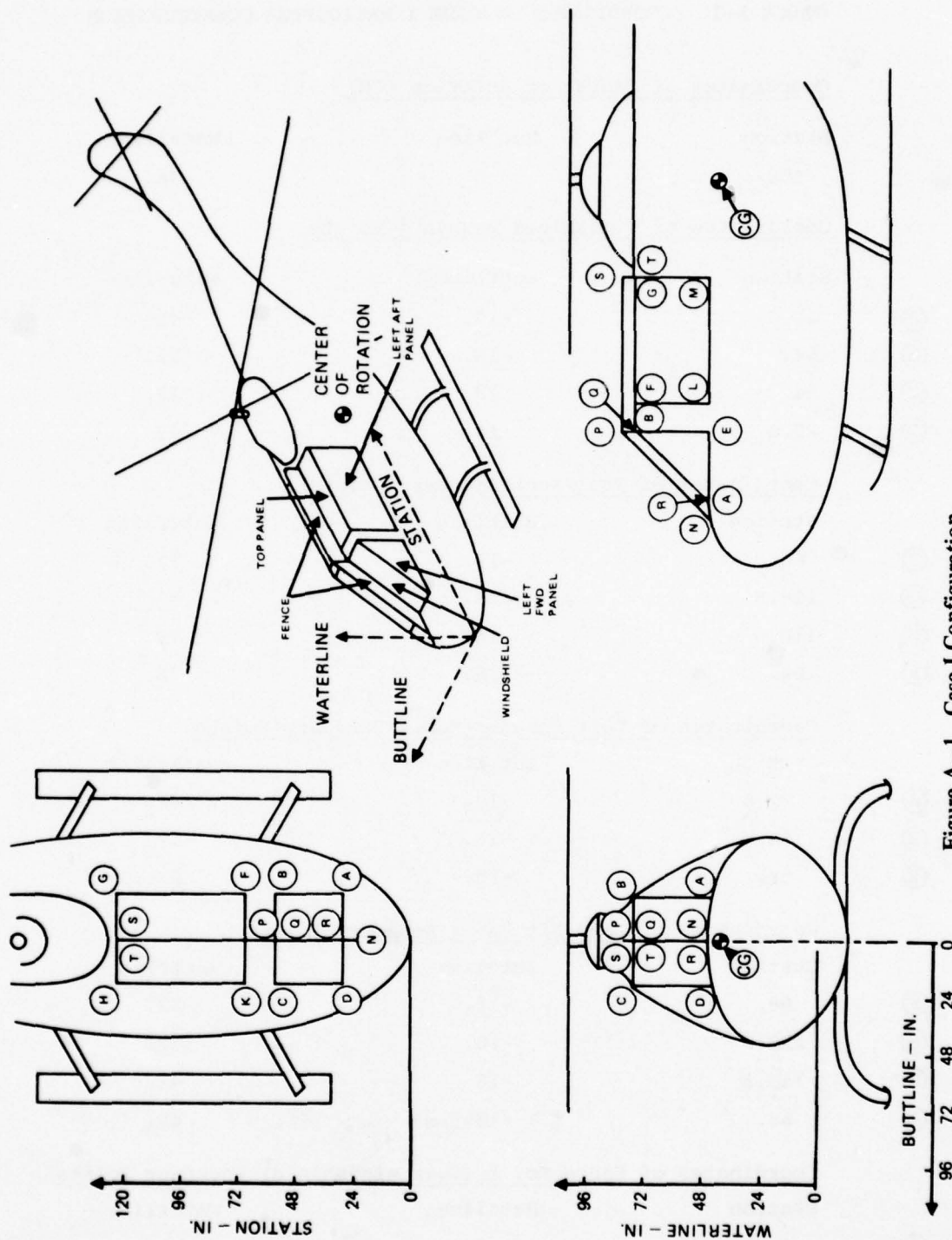


TABLE A-1. COORDINATES OF CASE I HELICOPTER CONFIGURATION

Coordinates of Center of Rotation (CG)

Station	Buttline	Waterline
150.	0	36.

Coordinates of Windshield Boundary Points

	Station	Buttline	Waterline
(A)	27.6	-18.	42.
(B)	54.	-18.	72.
(C)	54.	18.	72.
(D)	27.6	18.	42.

Coordinates of Top Panel Boundary Points

	Station	Buttline	Waterline
(F)	66.	-18.	72.
(G)	118.8	-18.	72.
(H)	118.8	18.	72.
(K)	66.	18.	72.

Coordinates of Left Forward-Panel Boundary Points

	Station	Buttline	Waterline
(A)	27.6	-18.	42.
(B)	54.	-18.	72.
(E)	54.	-18.	42.

Coordinates of Left-Aft Panel Boundary Points

	Station	Buttline	Waterline
(F)	66.	-18.	72.
(G)	118.8	-18.	72.
(M)	118.8	-18.	42.
(L)	66.	-18.	42.

Coordinates of Fence No. 1 (Over Windshield) Boundary Points

	Station	Buttline	Waterline
(N)	22.32	0	42.
(P)	54.	0	78.

TABLE A-1 - Continued

Coordinates of Fence No. 1 - Continued

	Station	Buttline	Waterline
Ⓚ	54.	0	72.
Ⓡ	27.6	0	42.

Coordinates of Fence No. 2 (Over Top Panel) Boundary Points

	Station	Buttline	Waterline
Ⓟ	54.	0	78.
Ⓢ	118.8	0	78.
Ⓣ	118.8	0	72.
Ⓚ	54.	0	72.

0., and DGAM will be 30. Aircraft headings shall cover the whole 360-degree range; therefore, PSIN will be equal to 9., PSII = -180., and DPSI = 45. These six values will take care of the third card. The fourth card contains the location of the center of rotation (XROT, YROT, ZROT). These values are measured on Figure A-1 and recorded at the top of Table A-1. The values are XROT = 150., YROT = 0., and ZROT = 36.

This is all the information needed for the fourth card. The fifth card contains the radial distance to all observers (DISTG), the minimum (ELVMIN) and maximum (ELVMAX) elevation angles, and the minimum (AZMMIN) and maximum (AZMMAX) azimuth angles. The distance to the observer will be assumed to be 1,000 feet. The elevation limits on the observers will be  $\pm 10$  degrees and the azimuth limits will be  $\pm 180$  degrees. Therefore the fifth card has DISTG = 1,000 feet, ELVMIN = -10 degrees, ELVMAX = 10 degrees, AZMMIN = -180 degrees and AZMMAX = 180 degrees. The sixth card contains the number of fences (FENCES), the number of reflective panels (PANELS), the plot option chosen (PLOT), and whether to calculate probability. For this configuration, FENCES = 2. and PANELS = 6. To get both printer-type and CALCOMP-type plots, set PLOT = 3., and to have probability calculated, PROBL = 1. This takes care of the control cards. The next six cards will contain fence data. The seventh card contains the number of boundary points associated with the first fence (over the windshield). There are four points; therefore, on the seventh card FPTS = 4. The eighth and ninth cards contain the four boundary points (N) (P) (Q) (R) from Table A-1.

The tenth card has the value for the number of boundary points defined for the second fence (over the top panel), FPTS = 4. The eleventh and twelfth cards contain the four boundary points (P) (S) (T) (Q). This completes the fence data. The rest of the data cards contain information about the reflective surfaces. The thirteenth card is an identification card for the first reflective surface read in. For this case it is the WINDSHIELD. The fourteenth card is the symmetry card for this surface. Since this is the first surface and therefore data must be read in for it, SYMTRY = 0. Since DEFLT = 1., the optional cards shown in Figure 17 pertaining to selecting



certain terms in the curve-fit equation will be omitted. The fifteenth card contains RPTS, the number of boundary points for this surface; RPTS has a value of 4. The sixteenth and seventeenth cards contain the four boundary points for this surface, (A) (B) (C) (D) .

This completes the data for the first reflective surface. The next surface to be read in will be the TOP PANEL, so identified on the eighteenth card. The nineteenth card is the symmetry card for this panel. This panel is not symmetric in any way to the windshield; therefore SYMTRY = 0. for this surface. The twentieth card contains the number of boundary points for this panel (RPTS = 4.). The twenty-first and twenty-second cards are for the four boundary points (F) (G) (H) (K) . This completes the data for the second reflective surface. The next surface to be read in is the LEFT FWD PANEL, so identified on the twenty-third card. This panel is symmetric to the right forward panel, but since it is read in first, SYMTRY = 0 for this surface. The twenty-fourth card is for the number of boundary points recorded for the left-forward surface; this number is three. The twenty-fifth and twenty-sixth cards are used for the three boundary points for this surface, (A) (B) (E) . The next panel to be read in should be the RIGHT FWD PANEL, since it is symmetric to the panel just read in, and therefore only an identification card and symmetry card are required. The twenty-seventh card will contain the identification for the right-forward panel, while the twenty-eighth card is the symmetry card which has a value of one since the right-and left-forward surfaces are symmetric about the x-z plane. The next panel to be read in is the LEFT AFT PANEL, so identified on the twenty-ninth card. Since this panel is not symmetric to the right-forward panel just read in, the symmetry card (the thirtieth card) contains a zero. The thirty-first card represents the number of boundary points for the left-aft panel (RPTS = 4.). The thirty-second and thirty-third cards contain the four boundary points for this surface, (F) (G) (M) (L) . The next surface to be read in is the RIGHT AFT PANEL, so identified on the thirty-fourth card. Since this surface is symmetric to the surface just read in, namely the left-aft panel, the thirty-fifth card (the symmetry card) will have a value of one, representing symmetry about the x-z

plane. This completes the input data for this case. The complete input in card image form is shown in Figure A-2. The complete results from this input are shown on pages 71 through 116.

FLAT SURFACES WITH FENCES			SAMPLE CASE ONE		
1.	2.	0.	0.		
3.	0.	30.	9.	-180.	45.
150.	0.	36.			
1000.	-10.	10.	-180.	180.	
2.	6.	3.	1.		
4.					
22.32	0.	42.	54.	0.	78.
54.	0.	72.	27.6	0.	42.
4.					
54.	0.	78.	118.8	0.	78.
118.8	0.	72.	54.	0.	72.
WINDSHIELD					
0.					
4.					
27.6	-18.	42.	54.	-18.	72.
54.	18.	72.	27.6	18.	42.
TOP PANEL					
0.					
4.					
56.	-18.	72.	118.8	-18.	72.
118.8	18.	72.	66.	18.	72.
LEFT FORWARD PANEL					
0.					
3.					
27.6	-18.	42.	54.	-18.	72.
54.	-18.	42.			
RIGHT FORWARD PANEL					
1.					
LEFT AFT PANEL					
0.					
4.					
56.	-18.	72.	118.8	-18.	72.
118.8	-18.	42.	66.	-18.	42.
RIGHT AFT PANEL					
1.					

Figure A-2. Input for Case I; Card Images.

# FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* INPUT DATA \*\*\*

\*\*CONTROL OPTIONS  
 1. PRINT OPTION 2.  
 3. PROBABILITY OPT 1.  
 \*\*AIRCRAFT INITIAL EULER ORIENTATION  
 0.0 ROLL 0.0 YAW -180.0  
 \*\*SELECTED YAW ANGLE ROTATIONS  
 9. INITIAL ANGLE -180.0 ANGLE INCREMENT 45.0  
 NO. OF ANGLES  
 \*\*SELECTED SUN ELEVATIONS  
 3. INITIAL ANGLE 0.0 ANGLE INCREMENT 30.0  
 NO. OF ANGLES

DISTANCE AT WHICH GLINT SIGNATURE FORMED (FT.) 1000.000

REFERENCE INFORMATION FOR MEASURING SUN GLINT ANGLES  
 REFERENCE POINT FOR MEASURING ANGLES OF GLINT SIGNATURE  
 X 150.00 Y 0.0 Z 36.00

\*\*PLOT SCALING  
 GLINT AZIMUTH  
 MINIMUM -180.0  
 MAXIMUM 180.0  
 GLINT ELEVATION  
 MINIMUM -10.0  
 MAXIMUM 10.0

\*\*BOUNDARIES FOR CALCULATING PROBABILITY  
 GLINT AZIMUTH  
 MINIMUM -180.0  
 MAXIMUM 180.0  
 GLINT ELEVATION  
 MINIMUM -10.0  
 MAXIMUM 10.0

## FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* INPUT DATA \*\*\*

\*\*FENCE DATA  
 NO. OF FENCES 2.

\*FENCE NO. 1  
 NUMBER OF POINTS 4.

BOUNDARY POINTS -- BODY AXES (STATIONLINE,BUTTLINE,WATERLINE)  
 X Y Z X Y Z  
 ( 1 ) 22.32 0.0 42.00 ( 2 ) 54.00 0.0 0.0  
 ( 4 ) 27.60 0.0 42.00 ( 3 ) 54.00 0.0 78.00  
 Z 78.00 Z 72.00

\*FENCE NO. 2  
 NUMBER OF POINTS 4.

BOUNDARY POINTS -- BODY AXES (STATIONLINE,BUTTLINE,WATERLINE)  
 X Y Z X Y Z  
 ( 1 ) 54.00 0.0 78.00 ( 2 ) 118.80 0.0 0.0  
 ( 4 ) 54.00 0.0 72.00 ( 3 ) 118.80 0.0 72.00

FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* INPUT DATA \*\*\*

\*\*REFLECTIVE SURFACE DATA  
NO. OF SURFACES 6.

\*REFLECTIVE SURFACE NO. 1 IDENTIFICATION: WINDSHIELD

CURVE-FIT INPUT DATA

DESIRED TERMS FOR CURVE-FITTING

(1) X TERM 0.	(2) Y TERM 0.	(3) Z TERM 0.	(4) XY TERM 0.	(5) XZ TERM 0.
(6) YZ TERM 0.	(7) XSQ TERM 0.	(8) YSQ TERM 0.	(9) ZSQ TERM 0.	

INPUT VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF 0.0	(2) Y COEF 0.0	(3) Z COEF 0.0
(4) XY COEF 0.0	(5) XZ COEF 0.0	(6) YZ COEF 0.0
(7) XSQ COEF 0.0	(8) YSQ COEF 0.0	(9) ZSQ COEF 0.0
(10) CONSTANT 0.0		

BOUNDARY POINTS -- BODY AXES (STATIONLINE,BUTLINE,WATERLINE)

(1) X 27.60	Y -18.00	Z 42.00	(2) X 54.00	Y -18.00	Z 72.00
(4) X 27.60	Y 18.00	Z 42.00	(3) X 54.00	Y 18.00	Z 72.00

\*REFLECTIVE SURFACE NO. 2 IDENTIFICATION: TOP PANEL

CURVE-FIT INPUT DATA

DESIRED TERMS FOR CURVE-FITTING

(1) X TERM 0.	(2) Y TERM 0.	(3) Z TERM 0.	(4) XY TERM 0.	(5) XZ TERM 0.
(6) YZ TERM 0.	(7) XSQ TERM 0.	(8) YSQ TERM 0.	(9) ZSQ TERM 0.	

INPUT VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF 0.0	(2) Y COEF 0.0	(3) Z COEF 0.0
(4) XY COEF 0.0	(5) XZ COEF 0.0	(6) YZ COEF 0.0
(7) XSQ COEF 0.0	(8) YSQ COEF 0.0	(9) ZSQ COEF 0.0
(10) CONSTANT 0.0		

BOUNDARY POINTS -- BODY AXES (STATIONLINE,BUTLINE,WATERLINE)

(1) X 66.00	Y -18.00	Z 72.00	(2) X 118.80	Y -18.00	Z 72.00
(4) X 66.00	Y 18.00	Z 72.00	(3) X 118.80	Y 18.00	Z 72.00

\*REFLECTIVE SURFACE NO. 3 IDENTIFICATION: LEFT FORWARD PANEL

CURVE-FIT INPUT DATA

DESIRED TERMS FOR CURVE-FITTING

(1) X TERM 0.	(2) Y TERM 0.	(3) Z TERM 0.	(4) XY TERM 0.	(5) XZ TERM 0.
(6) YZ TERM 0.	(7) XSQ TERM 0.	(8) YSQ TERM 0.	(9) ZSQ TERM 0.	



FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* INPUT DATA \*\*\*

• REFLECTIVE SURFACE NO. 3 IDENTIFICATION: LEFT FORWARD PANFL

INPUT VALUES FOR COEFFICIENTS OF SURFACE  
 (1) X COEF 0.0 (2) Y COEF 0.0 (3) Z COEF 0.0  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSO COEF 0.0 (8) YSO COEF 0.0 (9) ZSO COEF 0.0  
 (10) CONSTANT 0.0

BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)

	X	Y	Z	X	Y	Z
(1)	27.60	-18.00	42.00	(2)	54.00	-18.00
						72.00
				(3)	54.00	42.00

• REFLECTIVE SURFACE NO. 4 IDENTIFICATION: RIGHT FORWARD PANEL

CURVE-FIT INPUT DATA

DESIRED TERMS FOR CURVE-FITTING

(1) X TERM	(2) Y TERM	(3) Z TERM	(4) XY TERM	(5) XZ TERM	(6) YZ TERM
(6) YZ TERM 0.	(7) XSO TERM 0.	(8) YSO TERM 0.	(9) ZSO TERM 0.		

INPUT VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF 0.0 (2) Y COEF 0.0 (3) Z COEF 0.0  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSO COEF 0.0 (8) YSO COEF 0.0 (9) ZSO COEF 0.0  
 (10) CONSTANT 0.0

BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)

	X	Y	Z	X	Y	Z
(1)	27.60	18.00	42.00	(2)	54.00	18.00
						72.00
				(3)	54.00	42.00

• REFLECTIVE SURFACE NO. 5 IDENTIFICATION: LEFT AFT PANFL

CURVE-FIT INPUT DATA

DESIRED TERMS FOR CURVE-FITTING

(1) X TERM	(2) Y TERM	(3) Z TERM	(4) XY TERM	(5) XZ TERM	(6) YZ TERM
(6) YZ TERM 0.	(7) XSO TERM 0.	(8) YSO TERM 0.	(9) ZSO TERM 0.		

INPUT VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF 0.0 (2) Y COEF 0.0 (3) Z COEF 0.0  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSO COEF 0.0 (8) YSO COEF 0.0 (9) ZSO COEF 0.0  
 (10) CONSTANT 0.0

BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)

	X	Y	Z	X	Y	Z
(1)	66.00	-18.00	72.00	(2)	118.80	-18.00
						72.00
				(3)	118.80	42.00

FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* INPUT DATA \*\*\*

\*REFLECTIVE SURFACE NO. 4 IDENTIFICATION: RIGHT AFT PANEL

CURVE-FIT INPUT DATA

DESIRED TERMS FOR CURVE-FITTING

(1) X TERM 0.	(2) Y TERM 0.	(3) Z TERM 0.	(4) XY TERM 0.	(5) XZ TERM 0.	(6) YZ TERM 0.
(7) XZ TERM 0.	(8) YZ TERM 0.	(9) ZSQ TERM 0.	(10) XZ TERM 0.	(11) YZ TERM 0.	(12) ZSQ TERM 0.

INPUT VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF 0.0	(2) Y COEF 0.0	(3) Z COEF 0.0
(4) XY COEF 0.0	(5) XZ COEF 0.0	(6) YZ COEF 0.0
(7) XZ COEF 0.0	(8) YZ COEF 0.0	(9) ZSQ COEF 0.0
(10) CONSTANT 0.0		

BOUNDARY POINTS -- BODY AXES (STATIONLINE,BUTLINE,WATERLINE)

(1) X	Y	Z	X	Y	Z
(2) 66.00	18.00	72.00	(3) 118.40	18.00	72.00
(4) 66.00	18.00	42.00			

WARNING TEST IN SIGNF SHOWS VECTORS PERPENDICULAR

WARNING TEST IN SIGNF SHOWS VECTORS PERPENDICULAR

FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* RESULTS OF CURVE-FIT ANALYSIS \*\*\*

\*\*FENCE DATA

\*FENCE NO. 1

VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF 0.0	(2) Y COEF 0.1507E-01	(3) Z COEF 0.0	(4) CONSTANT 0.0
----------------	-----------------------	----------------	------------------

ROOT MEAN SQUARE ERROR OF FIT= 0.0

\*FENCE NO. 2

VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF 0.0	(2) Y COEF 0.2124E-01	(3) Z COEF 0.0	(4) CONSTANT 0.0
----------------	-----------------------	----------------	------------------

ROOT MEAN SQUARE ERROR OF FIT= 0.0

FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* RESULTS OF CURVE-FIT ANALYSIS \*\*\*

\*\*REFLECTIVE SURFACE DATA

\*REFLECTIVE SURFACE NO. 1 IDENTIFICATION: WINDSHIELD

VALUES FOR COEFFICIENTS OF SURFACE  
 (1) X COEF -0.7832E-02 (2) Y COEF 0.0 (3) Z COEF 0.6892E-02  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) YSQ COEF 0.0 (8) YSQ COEF 0.0 (9) ZSQ COEF 0.0  
 (10) CONSTANT -0.1000E 01

ROOT MEAN SQUARE ERROR OF FIT= 0.9813E-17

\*REFLECTIVE SURFACE NO. 2 IDENTIFICATION: TOP PANEL

VALUES FOR COEFFICIENTS OF SURFACE  
 (1) X COEF -0.9607E-18 (2) Y COEF 0.0 (3) Z COEF 0.2778E-01  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSQ COEF 0.0 (8) YSQ COEF 0.0 (9) ZSQ COEF 0.0  
 (10) CONSTANT -0.1000E 01

ROOT MEAN SQUARE ERROR OF FIT= 0.2944E-16

\*REFLECTIVE SURFACE NO. 3 IDENTIFICATION: LEFT FORWARD PANEL

VALUES FOR COEFFICIENTS OF SURFACE  
 (1) X COEF -0.4208E-16 (2) Y COEF -0.5556E-01 (3) Z COEF 0.1989E-16  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSQ COEF 0.0 (8) YSQ COEF 0.0 (9) ZSQ COEF 0.0  
 (10) CONSTANT -0.1000E 01

ROOT MEAN SQUARE ERROR OF FIT= 0.3830E-15

\*REFLECTIVE SURFACE NO. 4 IDENTIFICATION: RIGHT FORWARD PANEL

VALUES FOR COEFFICIENTS OF SURFACE  
 (1) X COEF -0.4208E-16 (2) Y COEF 0.5556E-01 (3) Z COEF 0.1989E-16  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSQ COEF 0.0 (8) YSQ COEF 0.0 (9) ZSQ COEF 0.0  
 (10) CONSTANT -0.1000E 01

ROOT MEAN SQUARE ERROR OF FIT= 0.3830E-15

FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* RESULTS OF CURVE-FIT ANALYSIS \*\*\*

••REFLECTIVE SURFACE DATA

•REFLECTIVE SURFACE NO. 5 IDENTIFICATION: LEFT AFT PANEL

VALUES FOR COEFFICIENTS OF SURFACE  
 (1) X COEF 0.8547E-1A (2) Y COEF -0.5556E-01 (3) Z COEF 0.7348E-17  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSO COEF 0.0 (8) YSO COEF 0.0 (9) ZSO COEF 0.0  
 (10) CONSTANT -0.1000E 01

ROOT MEAN SQUARE ERROR OF FIT= 0.9047E-16

•REFLECTIVE SURFACE NO. 6 IDENTIFICATION: RIGHT AFT PANEL

VALUES FOR COEFFICIENTS OF SURFACE  
 (1) X COEF 0.8547E-1A (2) Y COEF -0.5556E-01 (3) Z COEF 0.7348E-17  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSO COEF 0.0 (8) YSO COEF 0.0 (9) ZSO COEF 0.0  
 (10) CONSTANT -0.1000E 01

ROOT MEAN SQUARE ERROR OF FIT= 0.9047E-16



# FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 1 IDENTIFICATION: WINDSHIELD

SUN ELEVATION 0.0  
A/C PITCH ATTITUDE 9.0  
A/C ROLL ATTITUDE 0.0

XROT 150.00  
YROT 0.0  
ZROT 36.00  
Q15T6 1000.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, SUTLINE, WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INRFL	ISHAD	INTDF	AZIMUTH	ELEVATION
-180.00	27.60	-18.00	42.00	1	0	0	8.98	-82.70
-180.00	54.00	-18.00	72.00	1	0	0	8.97	-82.68
-180.00	54.00	18.00	72.00	1	0	0	8.79	-82.68
-180.00	27.60	18.00	42.00	1	0	0	8.81	-82.70
-135.00	27.60	-18.00	42.00	1	0	0	129.34	-44.51
-135.00	54.00	-18.00	72.00	1	0	0	128.22	-44.83
-135.00	54.00	18.00	72.00	1	0	0	128.20	-44.52
-135.00	27.60	18.00	42.00	1	0	0	128.32	-44.60
-90.00	27.60	-18.00	42.00	0	1	0	-178.29	1.02
-90.00	54.00	-18.00	72.00	0	1	0	-178.41	1.16
-90.00	54.00	18.00	72.00	0	0	1	-178.41	1.17
-90.00	27.60	18.00	42.00	0	0	1	-178.29	1.02
-45.00	27.60	-18.00	42.00	0	0	0	-127.19	44.47
-45.00	54.00	-18.00	72.00	0	0	0	-127.31	44.55
-45.00	54.00	18.00	72.00	0	0	0	-127.29	44.64
-45.00	27.60	18.00	42.00	0	0	0	-127.16	44.56
0.0	27.60	-18.00	42.00	0	0	0	-0.09	82.62
0.0	54.00	-18.00	72.00	0	0	0	-0.09	82.64
0.0	54.00	18.00	72.00	0	0	0	0.09	82.62
0.0	27.60	18.00	42.00	0	0	0	127.16	44.56
45.00	27.60	-18.00	42.00	0	0	0	127.29	44.64
45.00	54.00	-18.00	72.00	0	0	0	127.31	44.55

45.00	27.60	18.00	42.00	0	0	0	127.19	44.47
90.00	27.60	-18.00	42.00	0	0	1	178.29	1.02
90.00	54.00	-18.00	72.00	0	0	1	178.41	1.17
90.00	54.00	18.00	72.00	0	1	0	178.41	1.16
90.00	27.60	18.00	42.00	0	1	0	178.29	1.02
135.00	27.60	-18.00	42.00	1	0	0	-128.32	-44.60
135.00	54.00	-18.00	72.00	1	0	0	-128.20	-44.52
135.00	54.00	18.00	72.00	1	0	0	-128.22	-44.43
135.00	27.60	18.00	42.00	1	0	0	-128.34	-44.51
180.00	27.60	-18.00	42.00	1	0	0	-8.81	-82.70
180.00	54.00	-18.00	72.00	1	0	0	-8.79	-82.68
180.00	54.00	18.00	72.00	1	0	0	-8.87	-82.68
180.00	27.60	18.00	42.00	1	0	0	-8.98	-82.70

# FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 2 IDENTIFICATION: TOP PANEL

SUN ELEVATION 0.0  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

XROT 150.00  
YROT 0.0  
ZROT 36.00  
DISTG 1000.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (X, Y, Z)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INRFL	ISHAD	INTRF	AZIMUTH	ELEVATION
-180.00	66.00	-18.00	72.00	0	0	0	179.92	0.17
-180.00	118.80	-18.00	72.00	0	0	0	179.92	0.17
-180.00	118.80	18.00	72.00	0	0	0	-179.91	0.17
-180.00	66.00	18.00	72.00	0	0	0	-179.91	0.17
-135.00	66.00	-18.00	72.00	0	0	0	-179.78	0.17
-135.00	118.80	-18.00	72.00	0	0	0	-179.96	0.17
-135.00	118.80	18.00	72.00	0	0	0	-179.83	0.17
-135.00	66.00	18.00	72.00	0	0	0	-179.66	0.17
-90.00	66.00	-18.00	72.00	0	0	0	-179.60	0.17
-90.00	118.80	-18.00	72.00	0	0	0	-179.85	0.17
-90.00	118.80	18.00	72.00	0	0	0	-179.85	0.17
-90.00	66.00	18.00	72.00	0	0	0	-179.60	0.17
-45.00	66.00	-18.00	72.00	0	0	0	-179.66	0.17
-45.00	118.80	-18.00	72.00	0	0	0	-179.83	0.17
-45.00	118.80	18.00	72.00	0	0	0	-179.96	0.17
-45.00	66.00	18.00	72.00	0	0	0	-179.78	0.17
0.0	66.00	-18.00	72.00	0	0	0	-179.91	0.17
0.0	118.80	-18.00	72.00	0	0	0	-179.91	0.17
0.0	118.80	18.00	72.00	0	0	0	179.91	0.17
0.0	66.00	18.00	72.00	0	0	0	179.91	0.17
45.00	66.00	-18.00	72.00	0	0	0	179.78	0.17
45.00	118.80	-18.00	72.00	0	0	0	179.96	0.17
45.00	118.80	18.00	72.00	0	0	0	179.83	0.17

45.00	66.00	18.00	72.00	0	0	0	179.66	0.17
90.00	66.00	-18.00	72.00	0	0	0	179.60	0.17
90.00	118.80	-18.00	72.00	0	0	0	179.85	0.17
90.00	118.80	18.00	72.00	0	0	0	179.85	0.17
90.00	66.00	18.00	72.00	0	0	0	179.60	0.17
135.00	66.00	-18.00	72.00	0	0	0	179.66	0.17
135.00	118.80	-18.00	72.00	0	0	0	179.83	0.17
135.00	118.80	18.00	72.00	0	0	0	179.96	0.17
135.00	66.00	18.00	72.00	0	0	0	179.78	0.17
180.00	66.00	-18.00	72.00	0	0	0	179.91	0.17
180.00	118.80	-18.00	72.00	0	0	0	179.91	0.17
180.00	118.80	18.00	72.00	0	0	0	-179.92	0.17
180.00	66.00	18.00	72.00	0	0	0	-179.92	0.17



# FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 3 IDENTIFICATION: LEFT FORWARD PANEL

SUN ELEVATION 0.0  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

XROT 150.00  
YROT 0.0  
ZROT 36.00  
DISTG 1'00.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INRFL	ISHAD	INTRF	AZIMUTH	ELEVATION
-180.00	27.60	-18.00	42.00	1	0	0	-178.10	0.03
-180.00	54.00	-18.00	72.00	1	0	0	-178.09	0.17
-180.00	54.00	-18.00	42.00	1	0	0	-178.09	0.03
-135.00	27.60	-18.00	42.00	1	0	0	-90.47	0.03
-135.00	54.00	-18.00	72.00	1	0	0	-90.38	0.17
-135.00	54.00	-18.00	42.00	1	0	0	-90.38	0.03
-90.00	27.60	-18.00	42.00	1	1	0	1.42	0.03
-90.00	54.00	-18.00	72.00	1	1	0	1.54	0.17
-90.00	54.00	-18.00	42.00	1	0	0	1.54	0.03
-45.00	27.60	-18.00	42.00	1	0	0	89.65	0.03
-45.00	54.00	-18.00	72.00	1	0	0	89.74	0.17
-45.00	54.00	-18.00	42.00	1	0	0	89.74	0.03
0.0	27.60	-18.00	42.00	0	0	0	-179.91	0.03
0.0	54.00	-18.00	72.00	0	0	0	-179.91	0.17
0.0	54.00	-18.00	42.00	0	0	0	-179.91	0.03
45.00	27.60	-18.00	42.00	0	0	0	-89.53	0.03
45.00	54.00	-18.00	72.00	0	0	0	-89.62	0.17
45.00	54.00	-18.00	42.00	0	0	0	-89.62	0.03
90.00	27.60	-18.00	42.00	0	0	0	-1.41	0.03
90.00	54.00	-18.00	72.00	0	0	0	-1.54	0.17
90.00	54.00	-18.00	42.00	0	0	0	-1.54	0.03
135.00	27.60	-18.00	42.00	0	0	0	90.35	0.03
135.00	54.00	-18.00	72.00	0	0	0	90.26	0.17

135.00	54.00	-18.00	42.00	0	0	0	90.26	0.03
186.00	27.60	-18.00	42.00	0	0	0	177.92	0.03
180.00	54.00	-18.00	72.00	0	0	0	177.92	0.17
186.00	54.00	-18.00	42.00	0	0	0	177.92	0.03

# FLAT SURFACES WITH FINES SAMPLE CASE ONE

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 4				IDENTIFICATION: RIGHT FORWARD PANEL				XROT 150.00			
SUN ELEVATION				A/C PITCH ATTITUDE				YROT 0.0			
A/C ROLL ATTITUDE				DISTG 1000.00							
A/C YAW				BOUNDARY POINTS -- 600Y AXES				STATUS FLAGS FOR POINTS			
				(STATIONLINE, OUTLINE, WATERLINE)				HARFL ISHAD INTRF			
				X Y				AZIMUTH ELEVATION			
-180.00	27.60	18.00	42.00	0	0	0	0	-177.92	0.03		
-180.00	54.00	18.00	72.00	0	0	0	0	-177.92	0.17		
-180.00	54.00	18.00	42.00	0	0	0	0	-177.92	0.03		
-135.00	27.60	18.00	42.00	0	0	0	0	-60.35	0.03		
-135.00	54.00	18.00	72.00	0	0	0	0	-90.26	0.17		
-135.00	54.00	18.00	42.00	0	0	0	0	-90.26	0.03		
-90.00	27.60	18.00	42.00	0	0	0	0	1.41	0.03		
-90.00	54.00	18.00	72.00	0	0	0	0	1.54	0.17		
-90.00	54.00	18.00	42.00	0	0	0	0	1.54	0.03		
-45.00	27.60	18.00	42.00	0	0	0	0	89.53	0.03		
-45.00	54.00	18.00	72.00	0	0	0	0	89.62	0.17		
-45.00	54.00	18.00	42.00	0	0	0	0	89.62	0.03		
0.0	27.60	18.00	42.00	0	0	0	0	179.91	0.03		
0.0	54.00	18.00	72.00	0	0	0	0	179.91	0.17		
0.0	54.00	18.00	42.00	0	0	0	0	179.91	0.03		
45.00	27.60	18.00	42.00	1	0	0	0	-89.65	0.03		
45.00	54.00	18.00	72.00	1	0	0	0	-89.74	0.17		
45.00	54.00	18.00	42.00	1	0	0	0	-89.74	0.03		
90.00	27.60	18.00	42.00	1	1	0	0	-1.42	0.03		
90.00	54.00	18.00	72.00	1	1	0	0	-1.54	0.17		
90.00	54.00	18.00	42.00	1	0	0	0	-1.54	0.03		
135.00	27.60	18.00	42.00	1	0	0	0	90.47	0.03		
135.00	54.00	18.00	72.00	1	0	0	0	90.38	0.17		

135.00	54.00	19.00	42.00	1	0	0	90.36	0.23
182.00	27.50	18.00	42.00	1	0	0	178.10	0.23
180.00	54.00	19.00	72.00	1	0	0	179.09	0.17
180.00	54.00	19.00	42.00	1	0	0	178.09	0.13



# FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 1		IDENTIFICATION: LEFT AFT PANEL		STATUS FLAGS FOR POINTS										GLINT	
SUN ELEVATION 0.0		A/C PITCH ATTITUDE 0.0		BOUNDARY POINTS -- BODY AXES		X	Y	Z	INPFL	ISHAD	INTRF	AZIMUTH	ELEVATION		
A/C ROLL ATTITUDE 0.0		(STATIONLINE, BUTLINE, WATERLINE)													
A/C YAW															
-180.00		66.00	-18.00	72.00			1	0	0			-178.09	0.17		
-180.00		118.80	-18.00	72.00			1	0	0			-178.09	0.17		
-180.00		118.80	-18.00	42.00			1	0	0			-178.09	0.03		
-180.00		66.00	-18.00	42.00			1	0	0			-178.09	0.03		
-135.00		66.00	-18.00	72.00			1	0	0			-90.34	0.17		
-135.00		118.80	-18.00	72.00			1	0	0			-90.17	0.17		
-135.00		118.80	-18.00	42.00			1	0	0			-90.17	0.03		
-135.00		66.00	-18.00	42.00			1	0	0			-90.34	0.03		
-90.00		66.00	-18.00	72.00			1	0	0			1.60	0.17		
-90.00		118.80	-18.00	72.00			1	0	0			1.85	0.17		
-90.00		118.80	-18.00	42.00			1	0	0			1.85	0.03		
-90.00		66.00	-18.00	42.00			1	0	0			1.60	0.03		
-45.00		66.00	-18.00	72.00			1	0	0			89.78	0.17		
-45.00		118.80	-18.00	72.00			1	0	0			89.96	0.17		
-45.00		118.80	-18.00	42.00			1	0	0			89.96	0.03		
-45.00		66.00	-18.00	42.00			1	0	0			89.78	0.03		
0.0		66.00	-18.00	72.00			0	0	0			-179.91	0.17		
0.0		118.80	-18.00	72.00			0	0	0			-179.91	0.17		
0.0		118.80	-18.00	42.00			0	0	0			-179.91	0.03		
0.0		66.00	-18.00	42.00			0	0	0			-179.91	0.03		
45.00		66.00	-18.00	72.00			0	0	0			-89.66	0.17		
45.00		118.80	-18.00	72.00			0	0	0			-89.83	0.17		
45.00		118.80	-18.00	42.00			0	0	0			-89.83	0.03		

45.00	66.00	-18.00	42.00	0	0	0	-89.66	0.03
90.00	66.00	-18.00	72.00	0	0	0	-1.60	0.17
90.00	118.80	-18.00	72.00	0	0	0	-1.85	0.17
90.00	118.80	-18.00	42.00	0	0	0	-1.85	0.03
90.00	66.00	-18.00	42.00	0	0	0	-1.60	0.03
135.00	66.00	-18.00	72.00	0	0	0	90.22	0.17
135.00	118.80	-18.00	72.00	0	0	0	90.04	0.17
135.00	118.80	-18.00	42.00	0	0	0	90.04	0.03
135.00	66.00	-18.00	42.00	0	0	0	90.22	0.03
180.00	66.00	-18.00	72.00	0	0	0	177.92	0.17
180.00	118.80	-18.00	72.00	0	0	0	177.92	0.17
180.00	118.80	-18.00	42.00	0	0	0	177.92	0.03
180.00	66.00	-18.00	42.00	0	0	0	177.92	0.03

# FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 6 IDENTIFICATION: RIGHT AFT PANEL

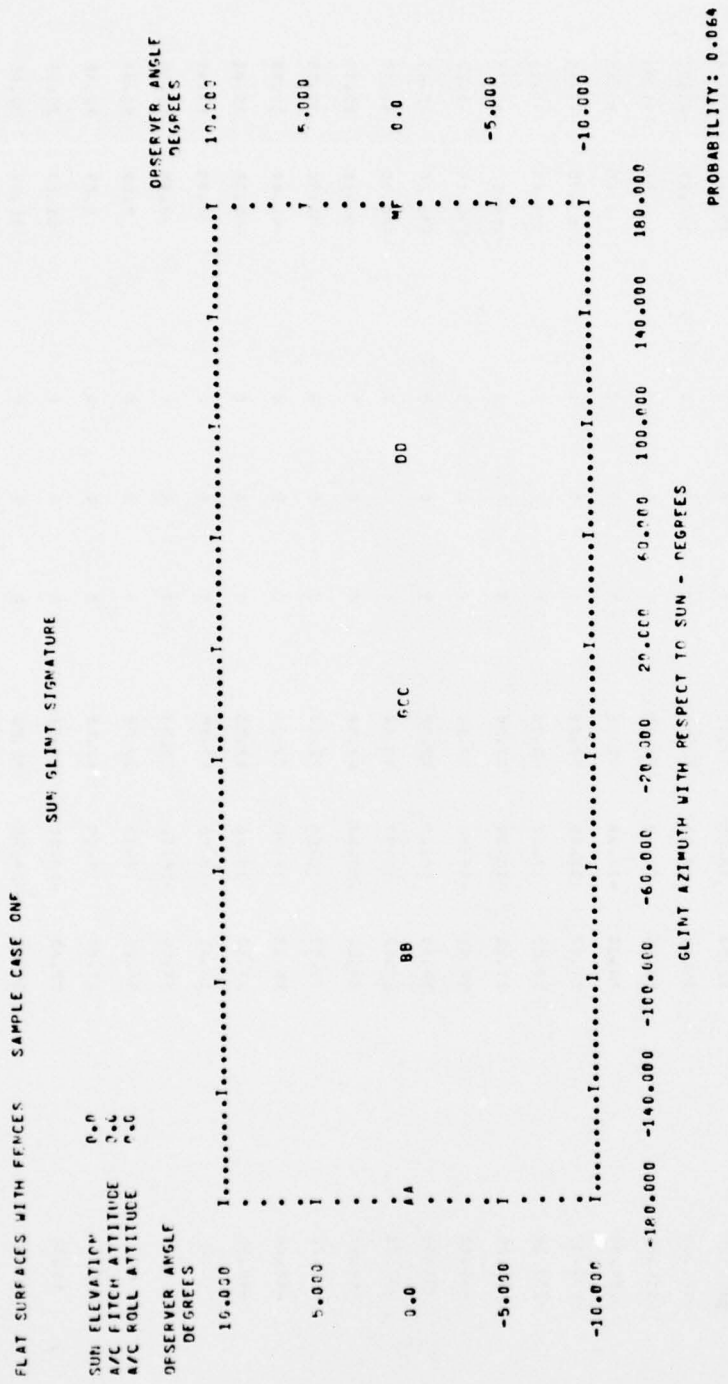
SUN ELEVATION 0.0  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

XROT 150.00  
YROT 0.0  
ZROT 36.00  
CISTG 1000.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, OUTLINE, WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INRFL	ISMAD	INTRF	AZIMUTH	ELEVATION
-180.00	66.00	18.00	72.00	0	0	0	-177.92	0.17
-180.00	118.80	18.00	72.00	0	0	0	-177.92	0.17
-180.00	118.80	18.00	42.00	0	0	0	-177.92	0.03
-180.00	66.00	18.00	42.00	0	0	0	-177.92	0.03
-135.00	66.00	18.00	72.00	0	0	0	-90.22	0.17
-135.00	118.80	18.00	72.00	0	0	0	-90.04	0.17
-135.00	118.80	18.00	42.00	0	0	0	-90.04	0.03
-135.00	66.00	18.00	42.00	0	0	0	-90.22	0.03
-90.00	66.00	18.00	72.00	0	0	0	1.60	0.17
-90.00	118.80	18.00	72.00	0	0	0	1.85	0.17
-90.00	118.80	18.00	42.00	0	0	0	1.65	0.03
-90.00	66.00	18.00	42.00	0	0	0	1.60	0.03
-45.00	66.00	18.00	72.00	0	0	0	89.66	0.17
-45.00	118.80	18.00	72.00	0	0	0	89.83	0.17
-45.00	118.80	18.00	42.00	0	0	0	89.83	0.03
-45.00	66.00	18.00	42.00	0	0	0	89.66	0.03
0.0	66.00	18.00	72.00	0	0	0	179.91	0.17
0.0	118.80	18.00	72.00	0	0	0	179.91	0.17
0.0	118.80	18.00	42.00	0	0	0	179.91	0.03
0.0	66.00	18.00	42.00	0	0	0	179.91	0.03
45.00	66.00	18.00	72.00	1	0	0	-89.78	0.17
45.00	118.80	18.00	72.00	1	0	0	-89.86	0.17
45.00	118.80	18.00	42.00	1	0	0	-89.86	0.03

45.00	66.00	1P.00	42.00	1	0	0	-89.78	0.03
90.00	66.00	1P.00	72.00	1	0	0	-1.60	0.17
90.00	118.80	1P.00	72.00	1	0	0	-1.85	0.17
90.00	118.60	1P.00	42.00	1	0	0	-1.85	0.03
90.00	66.00	1P.00	42.00	1	0	0	-1.60	0.03
135.00	66.00	1P.00	72.00	1	0	0	90.34	0.17
135.00	118.80	1P.00	72.00	1	0	0	90.17	0.17
135.00	118.60	1P.00	42.00	1	0	0	90.17	0.03
135.00	66.00	1P.00	42.00	1	0	0	90.34	0.03
180.00	66.00	1P.00	72.00	1	0	0	178.09	0.17
180.00	118.80	1P.00	72.00	1	0	0	178.09	0.17
180.00	118.60	1P.00	42.00	1	0	0	178.09	0.03
180.00	66.00	1P.00	42.00	1	0	0	178.09	0.03





KEY TO PLOT SYMBOLS

SYMBOL	A/C HEADING (DEG)	SYMBOL	A/C HEADING (DEG)
A	-180.00	F	45.00
B	-135.00	G	90.00
C	-90.00	H	135.00
D	-45.00	I	180.00
E	0.0		

FLAT SURFACE WITH FENCES SAMPLE CASE ONE

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 1 IDENTIFICATION: WINDSHIELD

SUN ELEVATION 30.00  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

MRPT 150.00  
YRPT 0.0  
ZRPT 36.00  
DISTG 1000.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLIN, WATERLINE)		STATUS FLAG'S FOR POINTS		GLINT	
	X	Y	INREL	ISHAD	INTRF	AZIMUTH ELEVATION
-180.00	27.60	-18.00	42.00	1	0	0 178.69 -67.07
-180.00	54.00	-18.00	72.00	1	0	0 178.69 -67.09
-180.00	54.00	18.00	72.00	1	0	0 178.86 -67.10
-180.00	27.60	18.00	42.00	1	0	0 178.87 -67.07
-135.00	27.60	-18.00	42.00	1	0	0 169.76 -41.93
-135.00	54.00	-18.00	72.00	1	0	0 169.65 -41.88
-135.00	54.00	18.00	72.00	1	0	0 169.75 -41.95
-135.00	27.60	18.00	42.00	1	0	0 169.85 -42.00
-90.00	27.60	-18.00	42.00	0	0	0 -148.64 -2.74
-90.00	54.00	-18.00	72.00	0	0	0 -148.75 -2.60
-90.00	54.00	18.00	72.00	0	0	0 -148.66 -2.61
-90.00	27.60	18.00	42.00	0	0	0 -148.55 -2.75
-45.00	27.60	-18.00	42.00	0	0	0 -91.49 32.75
-45.00	54.00	-18.00	72.00	0	0	0 -91.59 32.89
-45.00	54.00	18.00	72.00	0	0	0 -91.47 32.95
-45.00	27.60	18.00	42.00	0	0	0 -91.38 32.81
0.0	27.60	-18.00	42.00	0	0	0 -0.09 52.42
0.0	54.00	-18.00	72.00	0	0	0 -0.09 52.54
0.0	54.00	18.00	72.00	0	0	0 0.09 52.54
0.0	27.60	18.00	42.00	0	0	0 0.09 52.42
45.00	27.60	-18.00	42.00	0	0	0 91.38 32.81
45.00	54.00	-18.00	72.00	0	0	0 91.47 32.95
45.00	54.00	18.00	72.00	0	0	0 91.59 32.89

45.00	27.60	18.00	42.00	0	0	0	91.49	32.75
90.00	27.60	-18.00	42.00	0	0	0	148.55	-2.75
90.00	54.00	-18.00	72.00	0	0	0	148.66	-2.61
90.00	54.00	18.00	72.00	0	0	0	148.75	-2.60
90.00	27.60	18.00	42.00	0	0	0	148.64	-2.74
135.00	27.60	-18.00	42.00	1	0	0	-169.85	-42.00
135.00	54.00	-18.00	72.00	1	0	0	-169.75	-41.95
135.00	54.00	18.00	72.00	1	0	0	-169.65	-41.98
135.00	27.60	18.00	42.00	1	0	0	-169.76	-41.93
180.00	27.60	-18.00	42.00	1	0	0	-178.87	-67.07
180.00	54.00	-18.00	72.00	1	0	0	-178.86	-67.10
180.00	54.00	18.00	72.00	1	0	0	-178.69	-67.09
180.00	27.60	18.00	42.00	1	0	0	-178.69	-67.07

FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 2 IDENTIFICATION: TOP PANEL

SUN ELEVATION 30.00  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

XROT 150.00  
YROT 0.0  
ZROT 36.00  
DISTG 1000.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, RUTLINE, WATERLINE)		STATUS FLAGS FOR POINTS			GLINT	
	X	Y	INREL	ISHAD	INTPF	AZIMUTH	ELEVATION
-180.00	66.00	-18.00	72.00	0	0	179.92	29.95
-180.00	118.80	-18.00	72.00	0	0	179.92	30.06
-180.00	118.80	18.00	72.00	0	0	-179.91	30.06
-180.00	66.00	18.00	72.00	0	0	-179.91	29.96
-135.00	66.00	-18.00	72.00	0	0	-179.78	29.98
-135.00	118.80	-18.00	72.00	0	0	-179.96	30.06
-135.00	118.80	18.00	72.00	0	0	-179.83	30.11
-135.00	66.00	18.00	72.00	0	0	-179.66	30.03
-90.00	66.00	-18.00	72.00	0	0	-179.60	30.09
-90.00	118.80	-18.00	72.00	0	0	-179.85	30.09
-90.00	118.80	18.00	72.00	0	0	-179.85	30.17
-90.00	66.00	18.00	72.00	0	0	-179.60	30.17
-45.00	66.00	-18.00	72.00	0	0	-179.66	30.22
-45.00	118.80	-18.00	72.00	0	0	-179.83	30.15
-45.00	118.80	18.00	72.00	0	0	-179.96	30.20
-45.00	66.00	18.00	72.00	0	0	-179.78	30.28
0.0	66.00	-18.00	72.00	0	0	-179.91	30.30
0.0	118.80	-18.00	72.00	0	0	-179.91	30.19
0.0	118.80	18.00	72.00	0	0	179.91	30.19
0.0	66.00	18.00	72.00	0	0	179.81	30.30
45.00	66.00	-18.00	72.00	0	0	179.78	30.28
45.00	118.80	-18.00	72.00	0	0	179.96	30.20
45.00	118.80	18.00	72.00	0	0	179.83	30.15



45.00	66.00	18.00	72.00	0	0	0	179.66	30.22
90.00	66.00	-18.00	72.00	0	0	0	179.60	30.17
90.00	118.80	-18.00	72.00	0	0	0	179.85	30.17
90.00	118.80	18.00	72.00	0	0	0	179.85	30.09
90.00	66.00	18.00	72.00	0	0	0	179.60	30.09
135.00	66.00	-18.00	72.00	0	0	0	179.66	30.03
135.00	118.80	-18.00	72.00	0	0	0	179.83	30.11
135.00	118.80	18.00	72.00	0	0	0	179.96	30.06
135.00	66.00	18.00	72.00	0	0	0	179.78	29.98
180.00	66.00	-18.00	72.00	0	0	0	179.91	29.96
180.00	118.80	-18.00	72.00	0	0	0	179.91	30.06
180.00	118.80	18.00	72.00	0	0	0	-179.92	30.06
180.00	66.00	18.00	72.00	0	0	0	-179.92	29.95

# FLAT SURFACES WITH SPICES SAMPLE CASE ONE

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 3 IDENTIFICATION: LEFT FORWARD PANEL

SUN ELEVATION: 30.00  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

XROT 150.00  
YROT 0.0  
ZROT 36.00  
DISTG 1'00.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, RUTLINE, WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INPFL	ISHAD	INTEF	AZIMUTH	ELEVATION
-180.00	27.60	-18.00	42.00	1	0	0	-178.10	-29.73
-180.00	54.00	-18.00	72.00	1	0	0	-178.09	-29.67
-180.00	54.00	-18.00	42.00	1	0	0	-178.09	-29.78
-135.00	27.60	-18.00	42.00	1	0	0	-90.47	-29.62
-135.00	54.00	-18.00	72.00	1	0	1	-90.38	-29.76
-135.00	54.00	-18.00	42.00	1	0	0	-90.38	-29.66
-90.00	27.60	-18.00	42.00	1	0	0	1.42	-30.02
-90.00	54.00	-18.00	72.00	1	0	0	1.54	-29.91
-90.00	54.00	-18.00	42.00	1	0	0	1.54	-30.02
-45.00	27.60	-18.00	42.00	1	0	0	89.65	-30.18
-45.00	54.00	-18.00	72.00	1	0	0	89.74	-30.04
-45.00	54.00	-18.00	42.00	1	1	0	89.74	-30.14
0.0	27.60	-18.00	42.00	0	0	0	-179.91	-30.23
0.0	54.00	-18.00	72.00	0	0	0	-179.91	-30.07
0.0	54.00	-18.00	42.00	0	0	0	-179.91	-30.18
45.00	27.60	-18.00	42.00	0	0	0	-89.63	-30.13
45.00	54.00	-18.00	72.00	0	0	0	-89.62	-29.96
45.00	54.00	-18.00	42.00	0	0	0	-89.62	-30.09
90.00	27.60	-18.00	42.00	0	0	0	-1.41	-29.64
90.00	54.00	-18.00	72.00	0	0	0	-1.54	-29.84
90.00	54.00	-18.00	42.00	0	0	0	-1.54	-29.64
135.00	27.60	-18.00	42.00	0	0	0	90.35	-29.77
135.00	54.00	-18.00	72.00	0	0	0	90.26	-29.70

135.00	54.00	-12.00	42.00	0	0	90.26	-20.81
180.00	27.60	-18.00	42.00	0	0	177.92	-29.72
180.00	54.00	-18.00	72.00	0	0	177.92	-20.67
180.00	54.00	-12.00	42.00	0	0	177.92	-20.78

AD-A061 322

BOEING VERTOL CO PHILADELPHIA PA  
CANOPY SUN GLINT EVALUATION COMPUTER PROGRAM.(U)  
SEP 78 F WHITE

F/G 1/3

DAAJ02-76-C-0061

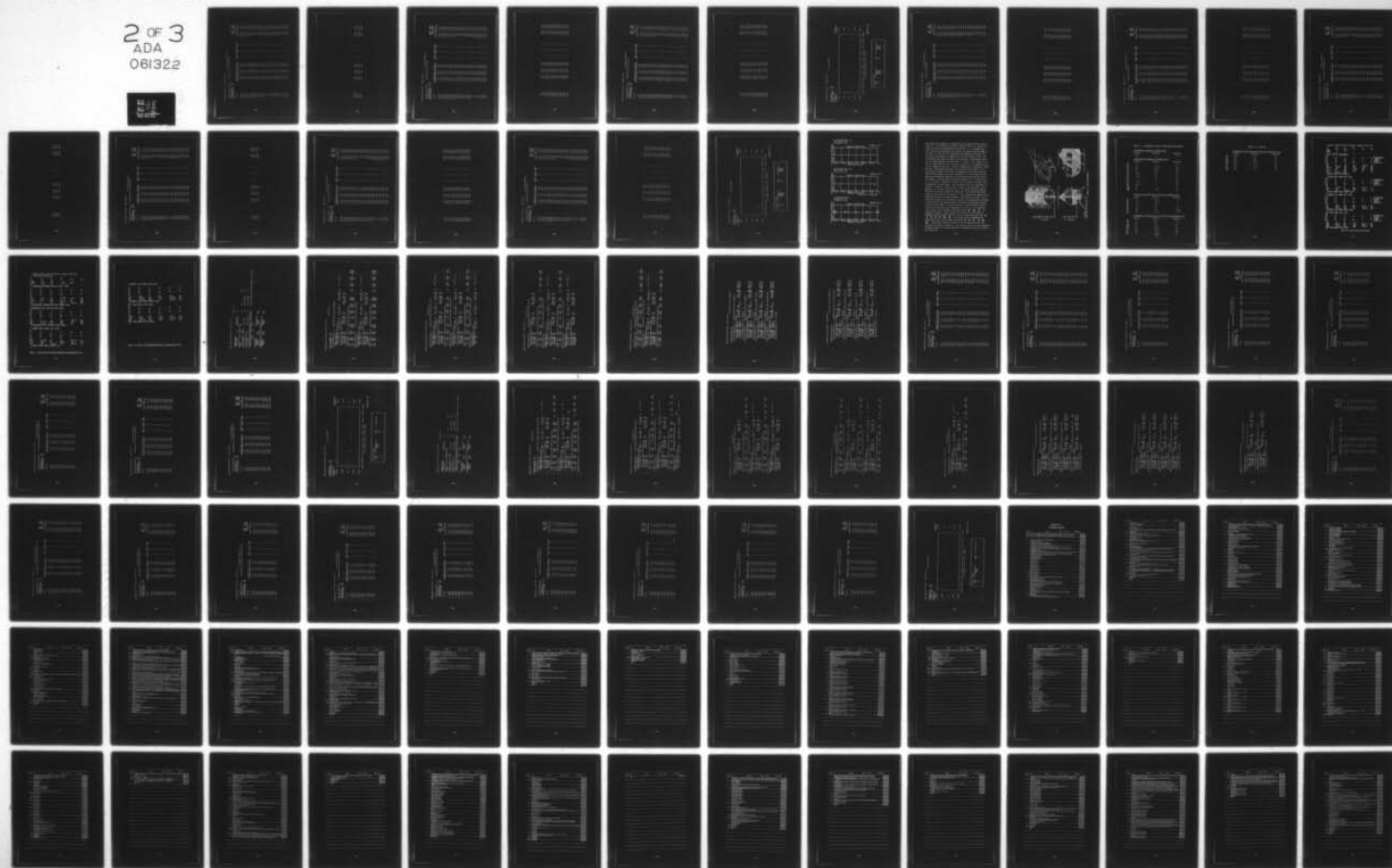
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# FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 4 IDENTIFICATION: RIGHT FORWARD PANEL

SUN ELEVATION 30.00  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

XROT 150.00  
YROT 0.0  
ZROT 30.00  
DISTG 100.00

A/C YEL	BOUNDARY POINTS -- BODY AXES (STATIONLINE, OUTLINE, WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INRFL	ISHAD	INTDF	AZIMUTH	ELEVATION
-180.00	27.60	18.00	42.00	1	0	0	-177.92	-29.72
-180.00	54.00	18.00	72.00	0	0	0	-177.92	-29.67
-180.00	54.00	18.00	42.00	0	0	0	-177.92	-29.78
-135.00	27.60	18.00	42.00	0	0	0	-60.35	-29.77
-135.00	54.00	18.00	72.00	0	0	0	-90.26	-29.70
-135.00	54.00	18.00	42.00	0	0	0	-90.26	-29.81
-90.00	27.60	18.00	42.00	0	0	0	1.41	-29.94
-90.00	54.00	18.00	72.00	0	0	0	1.54	-29.84
-90.00	54.00	18.00	42.00	0	0	0	1.54	-29.94
-45.00	27.60	18.00	42.00	0	0	0	69.53	-30.13
-45.00	54.00	18.00	72.00	0	0	0	89.62	-29.98
-45.00	54.00	18.00	42.00	0	0	0	89.62	-30.09
0.0	27.60	18.00	42.00	0	0	0	179.91	-30.23
0.0	54.00	18.00	72.00	0	0	0	179.91	-30.07
0.0	54.00	18.00	42.00	0	0	0	179.91	-30.18
45.00	27.60	18.00	42.00	1	0	0	-89.65	-30.18
45.00	54.00	18.00	72.00	1	0	0	-89.74	-30.04
45.00	54.00	18.00	42.00	1	1	0	-89.74	-30.10
90.00	27.60	18.00	42.00	1	0	0	-1.42	-30.02
90.00	54.00	18.00	72.00	1	0	0	-1.54	-29.91
90.00	54.00	18.00	42.00	1	0	0	-1.54	-30.02
135.00	27.60	18.00	42.00	1	0	0	89.47	-29.82
135.00	54.00	18.00	72.00	1	0	1	89.38	-29.76

135.00	54.00	18.00	42.00	1	0	00.38	-29.86
180.00	27.60	18.00	42.00	1	0	178.10	-29.73
180.00	54.00	18.00	72.00	1	0	178.09	-29.67
180.00	54.00	18.00	42.00	1	0	178.09	-29.78

FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* SUM GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 5 IDENTIFICATION: LEFT AFT PANEL

SUN ELEVATION 30.00  
A/C PITCH ATTITUDE 3.0  
A/C ROLL ATTITUDE 3.0

XROT 150.00  
YROT 0.0  
ZROT 36.00  
DISTG 1000.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, OUTLINE, WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INRFL	ISHAD	INTRF	AZIMUTH	ELEVATION
-180.00	66.00	-18.00	72.00	1	0	0	-176.09	-29.70
-180.00	118.00	-18.00	72.00	1	0	0	-176.09	-29.81
-180.00	118.00	-18.00	42.00	1	0	0	-176.09	-29.91
-180.00	66.00	-18.00	42.00	1	0	0	-176.09	-29.81
-135.00	66.00	-18.00	72.00	1	0	0	-90.34	-29.77
-135.00	118.00	-18.00	72.00	1	0	0	-90.17	-29.85
-135.00	118.00	-18.00	42.00	1	0	0	-90.17	-29.96
-135.00	66.00	-18.00	42.00	1	0	0	-50.34	-29.88
-90.00	66.00	-18.00	72.00	1	0	0	1.60	-29.91
-90.00	118.00	-18.00	72.00	1	0	0	1.85	-29.91
-90.00	118.00	-18.00	42.00	1	0	0	1.85	-30.02
-90.00	66.00	-18.00	42.00	1	0	0	1.60	-30.02
-45.00	66.00	-18.00	72.00	1	0	0	89.78	-30.02
-45.00	118.00	-18.00	72.00	1	0	0	89.96	-29.94
-45.00	118.00	-18.00	42.00	1	0	0	89.96	-30.05
-45.00	66.00	-18.00	42.00	1	0	0	89.78	-30.13
0.0	66.00	-18.00	72.00	0	0	0	-176.91	-30.04
0.0	118.00	-18.00	72.00	0	0	0	-176.91	-29.94
0.0	118.00	-18.00	42.00	0	0	0	-176.91	-30.04
0.0	66.00	-18.00	42.00	0	0	0	-176.91	-30.15
45.00	66.00	-18.00	72.00	0	0	0	-89.66	-29.97
45.00	118.00	-18.00	72.00	0	0	0	-89.83	-29.89
45.00	118.00	-18.00	42.00	0	0	0	-89.83	-30.00

45.00	66.00	-18.00	42.00	0	0	0	-89.66	-30.07
90.00	66.00	-18.00	72.00	0	0	0	-1.60	-29.64
90.00	118.80	-18.00	72.00	0	0	0	-1.85	-29.83
90.00	118.80	-18.00	42.00	0	0	0	-1.85	-29.94
90.00	66.00	-18.00	42.00	0	0	0	-1.60	-29.94
135.00	66.00	-18.00	72.00	0	0	0	90.22	-29.72
135.00	118.80	-18.00	72.00	0	0	0	90.84	-29.80
135.00	118.80	-18.00	42.00	0	0	0	90.04	-29.91
135.00	66.00	-18.00	42.00	0	0	0	90.22	-29.83
180.00	66.00	-18.00	72.00	0	0	0	177.92	-29.70
180.00	118.80	-18.00	72.00	0	0	0	177.92	-29.81
180.00	118.80	-18.00	42.00	0	0	0	177.92	-29.91
180.00	66.00	-18.00	42.00	0	0	0	177.92	-29.80



FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* SUM GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 6 IDENTIFICATION: RIGHT AFT PANEL

SUN ELEVATION 30.00  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

YROT 150.00  
XROT 0.0  
ZROT 36.00  
DISTG 1000.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (X, Y, Z)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INREL	ISHAD	INTPF	AZIMUTH	ELEVATION
-180.00	66.00	18.00	72.00	0	0	0	-177.92	-29.70
-180.00	118.80	18.00	72.00	0	0	0	-177.92	-29.81
-180.00	118.80	18.00	42.00	0	0	0	-177.92	-29.91
-180.00	66.00	18.00	42.00	0	0	0	-177.92	-29.80
-135.00	66.00	18.00	72.00	0	0	0	-90.22	-29.72
-135.00	118.80	18.00	72.00	0	0	0	-90.04	-29.80
-135.00	118.80	18.00	42.00	0	0	0	-90.04	-29.91
-135.00	66.00	18.00	42.00	0	0	0	-90.22	-29.83
-90.00	66.00	18.00	72.00	0	0	0	1.60	-29.84
-90.00	118.80	18.00	72.00	0	0	0	1.85	-29.83
-90.00	118.80	18.00	42.00	0	0	0	1.85	-29.94
-90.00	66.00	18.00	42.00	0	0	0	1.60	-29.84
-45.00	66.00	18.00	72.00	0	0	0	89.66	-29.97
-45.00	118.80	18.00	72.00	0	0	0	89.83	-29.89
-45.00	118.80	18.00	42.00	0	0	0	89.83	-29.80
-45.00	66.00	18.00	42.00	0	0	0	89.66	-30.07
0.0	66.00	18.00	72.00	0	0	0	179.91	-30.04
0.0	118.80	18.00	72.00	0	0	0	179.91	-29.94
0.0	118.80	18.00	42.00	0	0	0	179.91	-30.04
0.0	66.00	18.00	42.00	0	0	0	179.91	-30.14
45.00	66.00	18.00	72.00	1	0	0	-89.78	-30.02
45.00	118.80	18.00	72.00	1	0	0	-89.96	-29.94
45.00	118.80	18.00	42.00	1	0	0	-89.86	-30.05

45.00	66.00	18.00	42.00	1	0	0	-89.78	-30.13
90.00	66.00	18.00	72.00	1	0	0	-1.60	-29.91
90.00	118.80	18.00	72.00	1	0	0	-1.85	-29.91
90.00	118.80	18.00	42.00	1	0	0	-1.85	-30.02
92.00	66.00	18.00	42.00	1	0	0	-1.60	-30.02
95.00	66.00	18.00	72.00	1	0	0	90.34	-29.77
135.00	118.80	18.00	72.00	1	0	0	90.17	-29.85
135.00	118.80	18.00	42.00	1	0	0	90.17	-29.96
135.00	66.00	18.00	42.00	1	0	0	90.34	-29.88
180.00	66.00	18.00	72.00	1	0	0	178.09	-29.70
180.00	118.80	18.00	72.00	1	0	0	178.09	-29.81
183.00	118.80	18.00	42.00	1	0	0	178.09	-29.91
180.00	66.00	18.00	42.00	1	0	0	178.09	-29.81

# FLAT SURFACES WITH FENCES SAMPLE CASE ONE

## SUN GLINT SIGNATURE

SUN ELEVATION: 36.00  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 9.0

OBSERVER ANGLE  
DEGREES

OBSERVER ANGLE  
DEGREES

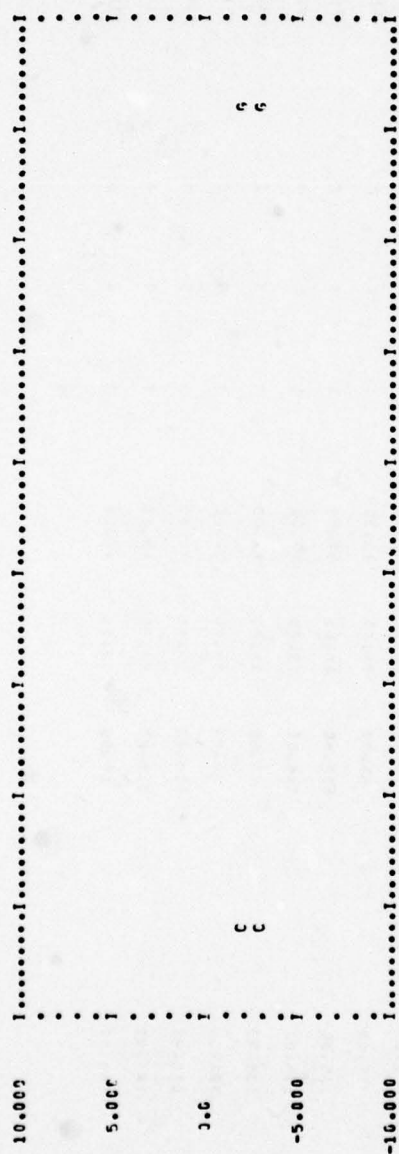
10.000

5.000

0.0

-5.000

-10.000



-180.000 -140.000 -100.000 -60.000 -20.000 20.000 60.000 100.000 140.000 180.000

GLINT AZIMUTH WITH RESPECT TO SUN - DEGREES

PROBABILITY: 0.004

## KEY TO PLOT SYMBOLS

SYMBOL	A/C HEADING (DEG)	SYMBOL	A/C HEADING (DEG)
A	-180.00	F	45.00
B	-135.00	G	90.00
C	-90.00	H	135.00
D	-45.00	M	180.00
E	0.0		



# FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 1 IDENTIFICATION: WINDSHIELD

SUN ELEVATION 60.00  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

XROT 150.00  
YROT 0.0  
ZROT 36.00  
DISTG 100.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, RUTLINE, WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INRFL	ISMAD	INTRF	AZIMUTH	ELEVATION
-180.00	27.60	-18.00	42.00	0	0	0	-179.71	-37.00
-180.00	54.00	-18.00	72.00	0	0	0	-179.71	-36.97
-180.00	54.00	18.00	72.00	0	0	0	-179.54	-34.97
-180.00	27.60	18.00	42.00	0	0	0	-179.54	-37.00
-135.00	27.60	-18.00	42.00	0	0	0	-158.32	-27.18
-135.00	54.00	-18.00	72.00	0	0	0	-158.37	-27.12
-135.00	54.00	18.00	72.00	0	0	0	-158.21	-27.14
-135.00	27.60	18.00	42.00	0	0	0	-158.16	-27.21
-90.00	27.60	-18.00	42.00	0	0	0	-118.95	-5.74
-90.00	54.00	-18.00	72.00	0	0	0	-119.01	-5.61
-90.00	54.00	18.00	72.00	0	0	0	-118.86	-5.62
-90.00	27.60	18.00	42.00	0	0	0	-118.80	-5.75
-45.00	27.60	-18.00	42.00	0	0	0	-66.23	13.81
-45.00	54.00	-18.00	72.00	0	0	0	-66.27	13.98
-45.00	54.00	18.00	72.00	0	0	0	-66.11	13.99
-45.00	27.60	18.00	42.00	0	0	0	-66.07	13.83
0.0	27.60	-18.00	42.00	0	0	0	-0.99	22.51
0.0	54.00	-18.00	72.00	0	0	0	-0.09	22.68
0.0	54.00	18.00	72.00	0	0	0	0.09	22.68
0.0	27.60	18.00	42.00	0	0	0	0.09	22.51
45.00	27.60	-18.00	42.00	0	0	0	66.07	13.83
45.00	54.00	-18.00	72.00	0	0	0	66.11	13.99
45.00	54.00	18.00	72.00	0	0	0	66.27	13.98



45.00	27.60	18.00	42.00	0	0	0	66.23	13.81
95.00	27.60	-18.00	42.00	0	0	0	118.80	-5.75
95.00	54.00	-18.00	72.00	0	0	0	118.86	-5.62
95.00	54.00	18.00	72.00	0	0	0	118.01	-5.61
95.00	27.60	18.00	42.00	0	0	0	118.95	-5.74
135.00	27.60	-18.00	42.00	0	0	0	158.16	-27.21
135.00	54.00	-18.00	72.00	0	0	0	158.21	-27.14
135.00	54.00	18.00	72.00	0	0	0	158.37	-27.12
135.00	27.60	18.00	42.00	0	0	0	158.32	-27.18
185.00	27.60	-18.00	42.00	0	0	0	179.54	-27.30
185.00	54.00	-18.00	72.00	0	0	0	179.54	-26.97
185.00	54.00	18.00	72.00	0	0	0	179.71	-36.97
185.00	27.60	18.00	42.00	0	0	0	179.71	-37.00

FLAT SURFACE WITH FENCES SAMPLE CASE ONE

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 2 IDENTIFICATION: TOP PANEL

SUN ELEVATION 60.00  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLIN, WATERLINE)		STATUS FLAGS FOR POINTS			GLINT	
	X	Y	INFL	ISAD	INTPF	AZIMUTH	ELEVATION
-180.00	66.00	-18.00	72.00	0	0	179.92	59.87
-180.00	118.80	-18.00	72.00	0	0	179.92	59.98
-180.00	118.80	18.00	72.00	0	0	-179.91	59.98
-180.00	66.00	18.00	72.00	0	0	-179.91	59.87
-135.00	66.00	-18.00	72.00	0	0	-179.78	59.89
-135.00	118.80	-18.00	72.00	0	0	-179.96	59.97
-135.00	118.80	18.00	72.00	0	0	-179.83	60.02
-135.00	66.00	18.00	72.00	0	0	-179.66	59.95
-90.00	66.00	-18.00	72.00	0	0	-179.60	60.01
-90.00	118.80	-18.00	72.00	0	0	-179.85	60.01
-90.00	118.80	18.00	72.00	0	0	-179.85	60.08
-90.00	66.00	18.00	72.00	0	0	-179.60	60.08
-45.00	66.00	-18.00	72.00	0	0	-179.66	60.14
-45.00	118.80	-18.00	72.00	0	0	-179.83	60.06
-45.00	118.80	18.00	72.00	0	0	-179.96	60.11
-45.00	66.00	18.00	72.00	0	0	-179.78	60.19
0.0	66.00	-18.00	72.00	0	0	-179.91	50.22
0.0	118.80	-18.00	72.00	0	0	-179.91	60.11
0.0	118.80	18.00	72.00	0	0	179.91	60.11
0.0	66.00	18.00	72.00	0	0	179.91	60.22
45.00	66.00	-18.00	72.00	0	0	179.78	60.19
45.00	118.80	-18.00	72.00	0	0	179.96	60.11
45.00	118.80	18.00	72.00	0	0	179.83	60.06

45.00	66.00	12.00	72.00	0	0	0	179.66	60.14
90.00	56.00	-12.00	72.00	0	0	0	179.60	60.00
90.00	112.00	-12.00	72.00	0	0	0	179.85	60.00
90.00	112.00	12.00	72.00	0	0	0	179.85	60.01
90.00	66.00	12.00	72.00	0	0	0	179.60	60.01
135.00	66.00	-12.00	72.00	0	0	0	179.66	59.95
135.00	112.00	-12.00	72.00	0	0	0	179.83	60.02
135.00	112.00	12.00	72.00	0	0	0	179.96	59.97
135.00	66.00	12.00	72.00	0	0	0	179.78	59.89
180.00	66.00	-12.00	72.00	0	0	0	179.91	59.87
180.00	112.00	-12.00	72.00	0	0	0	179.91	59.98
180.00	112.00	12.00	72.00	0	0	0	-179.92	59.98
180.00	66.00	12.00	72.00	0	0	0	-179.92	59.87

FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 3 IDENTIFICATION: LEFT FORWARD PANEL

SUN ELEVATION 60.00  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

XROT 150.00  
YROT 0.0  
ZROT 36.00  
DISTG 1000.00

A/C YAW	BOUNDARY POINTS --- BODY AXES (STATIONLINE, BUTTLIN, WATERLIN)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INRFL	ISHAD	INTRF	AZIMUTH	ELEVATION
-180.00	27.60	-18.00	42.00	1	0	0	-178.10	-59.74
-180.00	54.00	-18.00	72.00	1	0	0	-178.09	-59.76
-180.00	54.00	-18.00	42.00	1	0	0	-178.09	-59.79
-135.00	27.60	-18.00	42.00	1	0	0	-50.47	-59.84
-135.00	54.00	-18.00	72.00	1	0	0	-90.38	-59.84
-135.00	54.00	-18.00	42.00	1	0	0	-90.38	-59.88
-90.00	27.60	-18.00	42.00	1	0	0	1.42	-60.03
-90.00	54.00	-18.00	72.00	1	0	0	1.54	-60.00
-90.00	54.00	-18.00	42.00	1	1	0	1.54	-60.03
-45.00	27.60	-18.00	42.00	1	0	0	89.65	-60.20
-45.00	54.00	-18.00	72.00	1	0	0	89.74	-60.12
-45.00	54.00	-18.00	42.00	1	0	0	89.74	-60.16
0.0	27.60	-18.00	42.00	0	0	0	-179.91	-60.24
0.0	54.00	-18.00	72.00	0	0	0	-179.91	-60.15
0.0	54.00	-18.00	42.00	0	0	0	-179.91	-60.19
45.00	27.60	-18.00	42.00	0	0	0	-89.53	-60.14
45.00	54.00	-18.00	72.00	0	0	0	-89.62	-60.07
45.00	54.00	-18.00	42.00	0	0	0	-89.62	-60.11
90.00	27.60	-18.00	42.00	0	0	0	-1.41	-59.96
90.00	54.00	-18.00	72.00	0	0	0	-1.54	-59.92
90.00	54.00	-18.00	42.00	0	0	0	-1.54	-59.96
135.00	27.60	-18.00	42.00	0	0	0	90.35	-59.79
135.00	54.00	-18.00	72.00	0	0	0	90.26	-59.79



135.00	54.00	-18.00	42.00	0	0	0	90.26	-59.62
180.00	27.60	-18.00	42.00	0	0	0	177.92	-59.74
180.00	54.00	-18.00	72.00	0	0	0	177.92	-59.76
180.00	54.00	-18.00	42.00	0	0	0	177.92	-59.79

# FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 4  
 SUN ELEVATION 60.00  
 A/C PITCH ATTITUDE 0.0  
 A/C ROLL ATTITUDE 0.0

IDENTIFICATION: RIGHT FORWARD PANEL

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)		STATUS FLAGS FOR POINTS		GLINT	
	X	Y	INRFL	ISHAD	INTRF	AZIMUTH ELEVATION
-180.00	27.60	18.00	0	0	0	-177.92 -59.74
-180.00	54.00	18.00	0	0	0	-177.92 -59.76
-180.00	54.00	18.00	0	0	0	-177.92 -59.79
-135.00	27.60	18.00	0	0	0	-50.35 -59.79
-135.00	54.00	18.00	0	0	0	-50.26 -59.79
-135.00	54.00	18.00	0	0	0	-90.26 -59.82
-90.00	27.60	18.00	0	0	0	1.41 -59.96
-90.00	54.00	18.00	0	0	0	1.54 -59.92
-90.00	54.00	18.00	0	0	0	1.54 -59.96
-45.00	27.60	18.00	0	0	0	89.53 -60.14
-45.00	54.00	18.00	0	0	0	89.62 -60.07
-45.00	54.00	18.00	0	0	0	89.62 -60.11
0.0	27.60	18.00	0	0	0	179.91 -60.24
0.0	54.00	18.00	0	0	0	179.91 -60.15
0.0	54.00	18.00	0	0	0	179.91 -60.19
45.00	27.60	18.00	1	0	0	-89.65 -60.20
45.00	54.00	18.00	1	0	0	-89.74 -60.12
45.00	54.00	18.00	1	0	0	-89.74 -60.16
90.00	27.60	18.00	1	0	0	-1.42 -60.03
90.00	54.00	18.00	1	0	0	-1.54 -60.00
90.00	54.00	18.00	1	1	0	-1.54 -60.03
135.00	27.60	18.00	1	0	0	90.47 -59.84
135.00	54.00	18.00	1	0	0	90.38 -59.84

135.00	54.00	12.00	42.00	1	0	0	90.38	-59.88
180.00	27.60	12.00	42.00	1	0	0	178.10	-59.74
180.00	54.00	12.00	72.00	1	0	0	178.09	-59.74
185.00	54.00	12.00	42.00	1	0	0	178.09	-59.79

# FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 5 IDENTIFICATION: LEFT AFT PANEL

SUN ELEVATION 60.00  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

XROT 150.00  
YROT 0.0  
ZROT 36.00  
DISTG 1000.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INRFL	ISHAD	INTRF	AZIMUTH	ELEVATION
-180.00	66.00	-18.00	72.00	1	0	0	-178.09	-59.78
-180.00	118.80	-18.00	72.00	1	0	0	-178.09	-59.89
-180.00	118.80	-18.00	42.00	1	0	0	-178.09	-59.93
-180.00	66.00	-18.00	42.00	1	0	0	-178.09	-59.82
-135.00	66.00	-18.00	72.00	1	0	0	-90.34	-59.86
-135.00	118.80	-18.00	72.00	1	0	0	-90.17	-59.94
-135.00	118.80	-18.00	42.00	1	0	0	-90.17	-59.97
-135.00	66.00	-18.00	42.00	1	0	0	-90.34	-59.90
-90.00	66.00	-18.00	72.00	1	0	0	1.60	-60.00
-90.00	118.80	-18.00	72.00	1	0	0	1.85	-60.00
-90.00	118.80	-18.00	42.00	1	0	0	1.85	-60.03
-90.00	66.00	-18.00	42.00	1	0	0	1.60	-60.03
-45.00	66.00	-18.00	72.00	1	0	0	89.78	-60.11
-45.00	118.80	-18.00	72.00	1	0	0	89.96	-60.03
-45.00	118.80	-18.00	42.00	1	0	0	89.96	-60.06
-45.00	66.00	-18.00	42.00	1	0	0	89.78	-60.14
0.0	66.00	-18.00	72.00	0	0	0	-179.91	-60.13
0.0	118.80	-18.00	72.00	0	0	0	-179.91	-60.02
0.0	118.80	-18.00	42.00	0	0	0	-179.91	-60.06
0.0	66.00	-18.00	42.00	0	0	0	-179.91	-60.17
45.00	66.00	-18.00	72.00	0	0	0	-89.66	-60.05
45.00	118.80	-18.00	72.00	0	0	0	-89.83	-60.98
45.00	118.80	-18.00	42.00	0	0	0	-89.83	-60.01



45.00	66.00	-18.00	42.00	0	0	0	-89.66	-60.69
95.00	66.00	-18.00	72.00	0	0	0	-1.50	-59.92
90.00	118.80	-18.00	72.00	0	0	0	-1.85	-50.92
90.00	118.80	-18.00	42.00	0	0	0	-1.85	-50.96
90.00	66.00	-18.00	42.00	0	0	0	-1.60	-59.96
135.00	66.00	-18.00	72.00	0	0	0	90.22	-59.81
135.00	118.80	-18.00	72.00	0	0	0	90.04	-59.88
135.00	118.80	-18.00	42.00	0	0	0	90.04	-59.92
135.00	66.00	-18.00	42.00	0	0	0	90.22	-59.84
180.00	66.00	-18.00	72.00	0	0	0	177.92	-59.78
180.00	118.80	-18.00	72.00	0	0	0	177.92	-59.89
180.00	118.80	-18.00	42.00	0	0	0	177.92	-59.93
180.00	66.00	-18.00	42.00	0	0	0	177.92	-59.82

FLAT SURFACES WITH FENCES SAMPLE CASE ONE

\*\*\* SUM GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 6 IDENTIFICATION: RIGHT ART PANEL

SUN ELEVATION 60.00  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

WGT 150.00  
YWT 0.0  
ZWT 36.00  
NISTG 100.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, OUTLINE, WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INRFL	ISMAD	INTPF	AZIMUTH	ELEVATION
-180.00	66.00	18.00	72.00	0	0	0	-177.92	-59.78
-180.00	118.80	18.00	72.00	0	0	0	-177.92	-59.89
-180.00	118.80	18.00	42.00	0	0	0	-177.92	-59.93
-180.00	66.00	18.00	42.00	0	0	0	-177.92	-59.82
-135.00	66.00	18.00	72.00	0	0	0	-90.22	-59.81
-135.00	118.80	18.00	72.00	0	0	0	-90.04	-59.88
-135.00	118.80	18.00	42.00	0	0	0	-90.04	-59.92
-135.00	66.00	18.00	42.00	0	0	0	-90.22	-59.84
-90.00	66.00	18.00	72.00	0	0	0	1.60	-59.92
-90.00	118.80	18.00	72.00	0	0	0	1.85	-59.92
-90.00	118.80	18.00	42.00	0	0	0	1.85	-59.96
-90.00	66.00	18.00	42.00	0	0	0	1.60	-59.96
-45.00	66.00	18.00	72.00	0	0	0	89.66	-60.05
-45.00	118.80	18.00	72.00	0	0	0	89.83	-60.98
-45.00	118.80	18.00	42.00	0	0	0	89.83	-60.01
-45.00	66.00	18.00	42.00	0	0	0	89.66	-60.09
0.0	66.00	18.00	72.00	0	0	0	179.91	-60.12
0.0	118.80	18.00	72.00	0	0	0	179.91	-60.02
0.0	118.80	18.00	42.00	0	0	0	179.91	-60.06
0.0	66.00	18.00	42.00	0	0	0	179.91	-60.17
45.00	66.00	18.00	72.00	1	0	0	-89.78	-60.11
45.00	118.80	18.00	72.00	1	0	0	-89.96	-60.83
45.00	118.80	18.00	42.00	1	0	0	-89.96	-60.06

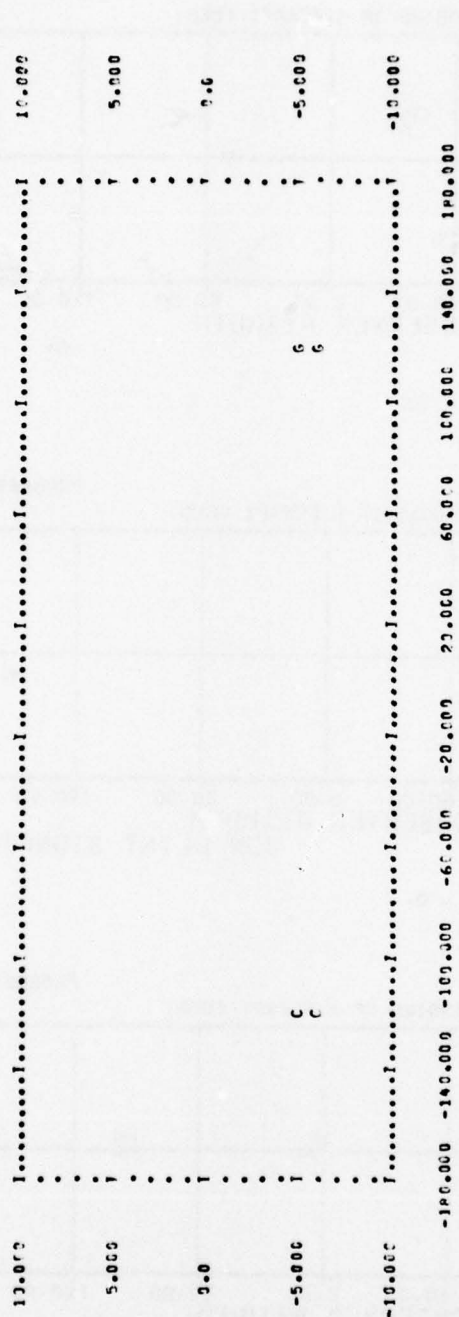
45.00	66.00	18.00	42.00	1	0	0	-59.72	-60.14
98.00	66.00	18.00	72.00	1	0	0	-1.60	-60.00
90.00	118.80	18.00	72.00	1	0	0	-1.85	-60.00
90.00	118.80	18.00	42.00	1	0	0	-1.85	-60.03
90.00	66.00	18.00	42.00	1	0	0	-1.60	-60.03
135.00	66.00	18.00	72.00	1	0	0	90.34	-59.86
135.00	118.80	18.00	72.00	1	0	0	90.17	-59.94
135.00	118.80	18.00	42.00	1	0	0	90.17	-59.97
135.00	66.00	18.00	42.00	1	0	0	90.34	-59.90
180.00	66.00	18.00	72.00	1	0	0	178.09	-59.78
180.00	118.80	18.00	72.00	1	0	0	178.09	-59.89
180.00	118.80	18.00	42.00	1	0	0	178.09	-59.93
180.00	66.00	18.00	42.00	1	0	0	178.09	-59.82

# FLAT SURFACES WITH FENCES SAMPLE CASE ONE

## SUN GLINT SIGNATURE

SUN ELEVATION: 60.00  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

OBSERVER ANGLE  
DEGREES



GLINT AZIMUTH WITH RESPECT TO SUN - DEGREES

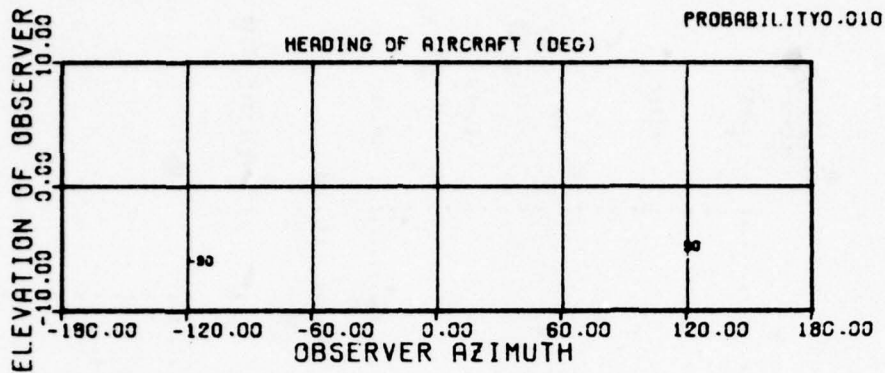
PROBABILITY: 0.010

## KEY TO PLOT SYMBOLS

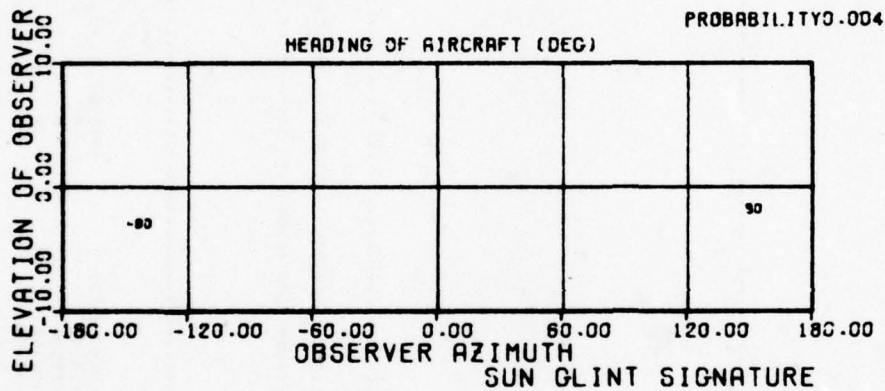
SYMBOL	A/C HEADING (DEG)	SYMBOL	A/C HEADING (DEG)
A	-180.00	F	45.00
B	-135.00	G	90.00
C	-90.00	K	135.00
D	-45.00	M	180.00
E	0.0		



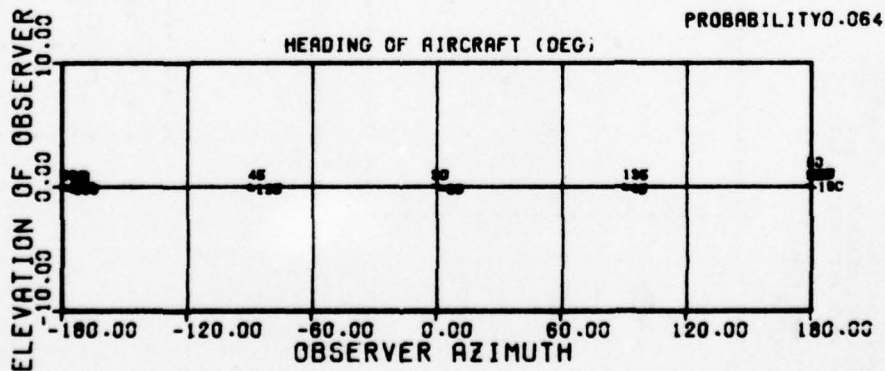
SUN ELEVATION ANGLE = 50.  
 A/C PITCH ATT = 0.0  
 A/C ROLL ATT = 0.0



SUN ELEVATION ANGLE = 30.  
 A/C PITCH ATT = 0.0  
 A/C ROLL ATT = 0.0



SUN ELEVATION ANGLE = 0.  
 A/C PITCH ATT = 0.0  
 A/C ROLL ATT = 0.0



The second case represents a configuration with curved surfaces, shown in Figure A-3. The tabulation of points is shown in Table A-2. Some of the output data has been suppressed by setting PLOT = 2., no CALCOMP plots. Also, only one sun elevation, zero degrees, was chosen by setting GAMN = 1. and GAMI = 0. And since the glints from the windshield alone will vary from -180 to 180 degrees in azimuth at an aircraft heading of zero, only two headings were chosen to avoid much overlapping. The headings chosen were -45 and 45 degrees, by setting PSIN = 2., PSII = -45., and DPSI = 90. The card images for this case are shown in Figure A-4. The default option was not chosen for this case, in order to demonstrate the additional inputs required. These additional inputs, which specify which terms to use in the curve-fit analysis, come after the symmetry card for each reflective surface input except those that are symmetrical to the preceding surface. Additional engineering judgment must be exercised when using this option. For instance, the first and second surfaces appear to be a function of  $x$ ,  $z$ ,  $x^2$ ,  $y^2$ , and  $z^2$ . Therefore, a value of one is placed on the data cards corresponding to these inputs. The side panels seem to be independent of  $x$  and  $x^2$ . Therefore, a value of one is placed on the data cards corresponding to  $z$ ,  $y^2$ , and  $z^2$  locations only. The results from the inputs of Figure A-4 are shown on pages 123 through 138. It was found using these terms that the error for the curve-fit of the windshield was substantially higher than that for the other surfaces. This brings up a point. By inspecting the results of the curve-fit analysis, the program user can decide if one or more of the surfaces needs to be broken up into smaller pieces. A closer look at Figure A-3 reveals that part of the windshield actually looks like a side panel, thus independent of  $x$  and  $x^2$ . If an imaginary line is drawn on the windshield connecting points (KK) (DD) (D), two surfaces are formed. Surface number one, which will be identified as WINDSHIELD FORWARD SECTION LEFT SIDE, will be formed from points (D) (E) (F) (G) (H) (K) (KK) (DD). The second surface, WINDSHIELD AFT SECTION LEFT SIDE, will be formed from points (A) (B) (C) (D) (DD) (KK). The modified inputs for case II with this decomposition of the windshield are shown in Figure A-5. The curve-fit result for the windshield as shown on page 145 is greatly improved; the complete results are on pages 139 through 158.

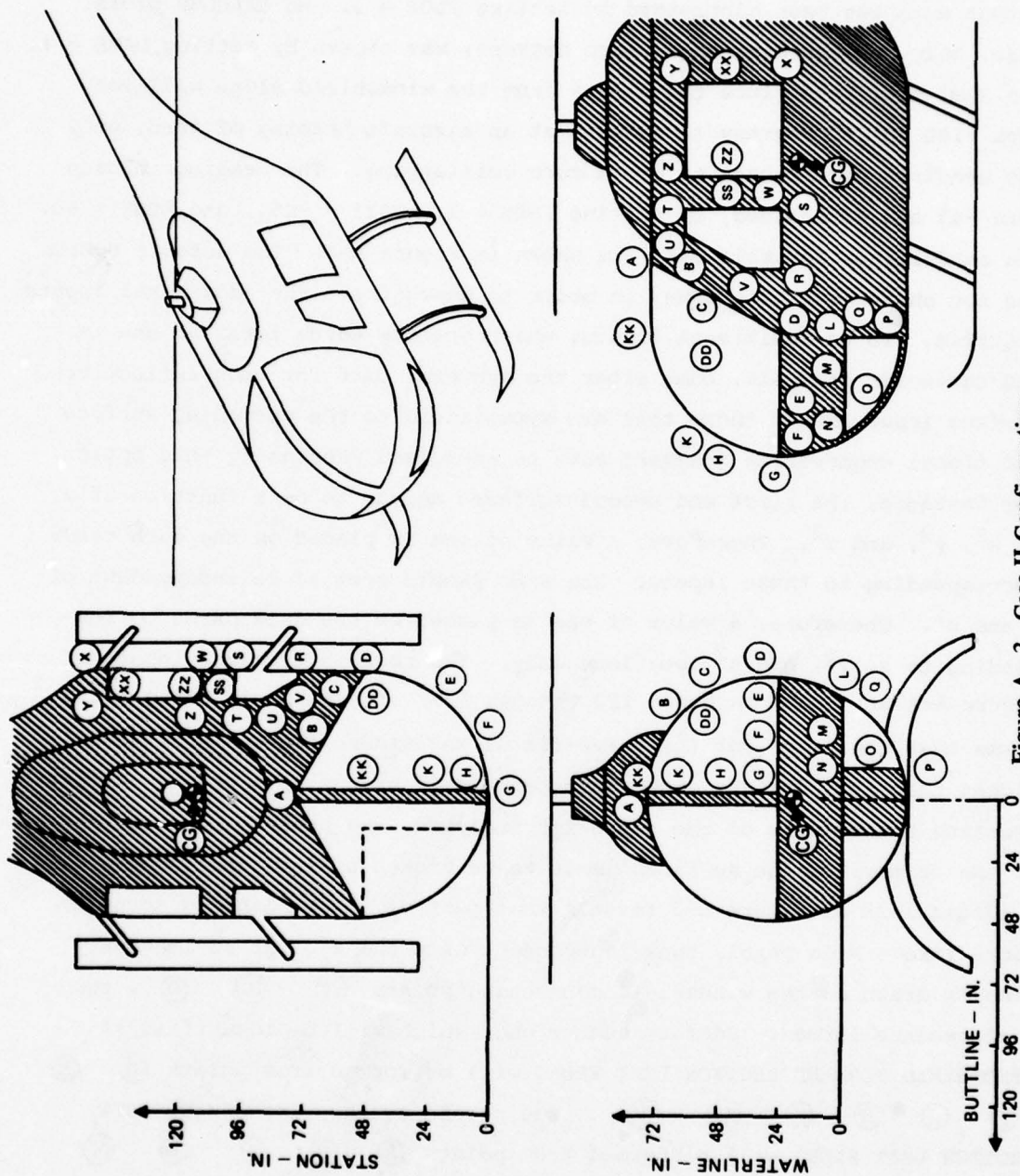


Figure A-3. Case II Configuration.



TABLE A-2. COORDINATES OF CASE II HELICOPTER CONFIGURATION

Coordinates of Center of Rotation (CG)

Station	Buttline	Waterline
114.	0	18.

Coordinates of Windshield Boundary Points

	Station	Buttline	Waterline
(A)	72.	0	72.
(B)	66.	-33.75	60.
(C)	60.	-41.57	48.
(D)	48.	-48.	24.
(E)	16.25	-36.	24.
(F)	6.43	-24.	24.
(G)	0	0	24.
(H)	6.43	0	48.
(K)	16.25	0	60.
(KK)	48.	0	72.
(DL)	48.	-37.47	54.

Coordinates of Lower Panel (Left Side) Boundary Points

	Station	Buttline	Waterline
(L)	48.	-41.57	0
(M)	30.	-37.47	0
(N)	8.2	-12.	0
(O)	18.6	-12.	-12.
(P)	48.	-12.	-22.48
(Q)	48.	-37.47	- 6.

Coordinates of Forward Side Panel (Left Side) Boundary Points

	Station	Buttline	Waterline
(R)	72	-48.	24.
(S)	96.	-48.	24.
(SS)	96.	-44.5	42.
(T)	96.	-31.75	60.
(U)	84.	-31.75	60.
(V)	72.	-46.48	36.



TABLE A-2 - Continued

Coordinates of Aft Side Panel (Left Side) Boundary Points

	Station	Buttline	Waterline
Ⓜ	108.	-48.	24.
Ⓧ	144.	-48.	24.
ⓍⓍ	144.	-44.5	42.
Ⓨ	144.	-31.75	60.
Ⓩ	108.	-31.75	60.
ⓏⓏ	108.	-44.5	42.

CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

0.	2.	0.	0.		
1.	0.	0.	2.	-45.	90.
114.	0.	18.			
1500.					
0.	8.	2.	1.		
LEFT SIDE OF WINDSHIELD					
0.					
1.	0.	1.	0.	0.	0.
1.	1.	1.			
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.		
11.					
72.	0.	72.	66.	-31.75	60.
60.	-41.57	48.	48.	-48.	24.
16.25	-36.	24.	6.43	-24.	24.
0.	0.	24.	6.43	0.	48.
16.25	0.	60.	48.	0.	72.
48.	-37.47	54.			
RIGHT SIDE OF WINDSHIELD					
1.					
LOWER FRONT PANEL LEFT SIDE					
0.					
1.	0.	1.	0.	0.	0.
1.	1.	1.			
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.		
6.					
48.	-41.57	0.	30.	-37.47	0.
8.2	-12.	0.	18.6	-12.	-12.
48.	-12.	-22.48	48.	-37.47	-6.
LOWER FRONT PANEL RIGHT SIDE					
1.					
FORWARD SIDE PANEL LEFT SIDE					
0.					
0.	0.	1.	0.	0.	0.
0.	1.	1.			
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.		
6.					
72.	-48.	24.	96.	-48.	24.
96.	-44.5	42.	96.	-31.75	60.
84.	-31.75	60.	72.	-46.48	36.
FORWARD SIDE PANEL RIGHT SIDE					
1.					
AFT SIDE PANEL LEFT SIDE					
0.					
0.	0.	1.	0.	0.	0.
0.	1.	1.			
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.		
6.					
108.	-48.	24.	144.	-48.	24.
144.	-44.5	42.	144.	-31.75	60.
108.	-31.75	60.	108.	-44.5	42.
AFT SIDE PANEL RIGHT SIDE					
1.					

ADDITIONAL  
INPUTS  
WHEN  
DEFLT = 0

ADDITIONAL  
INPUTS  
WHEN  
DEFLT = 0

ADDITIONAL  
INPUTS  
WHEN  
DEFLT = 0

ADDITIONAL  
INPUTS  
WHEN  
DEFLT = 0

Figure A-4. Input for Case II; Card Images.

CURVED PANELS WITH NO FENCES SAMPLE CASE TWO  
- MODIFIED WINDSHIELD

0.	2.	0.	0.		
1.	0.	0.	2.	-45.	90.
114.	0.	18.			
1500.	-10.	10.	-180.	180.	
0.	10.	2.	1.		

WINDSHIELD FORWARD SECTION LEFT SIDE

0.					
1.	0.	1.	0.	0.	0.
1.	1.	1.			
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.		
8.					
48.	-48.	24.	16.25	-36.	24.
6.43	-24.	24.	0.	0.	24.
6.43	0.	48.	16.25	0.	60.
48.	0.	72.	48.	-37.47	54.

WINDSHIELD FORWARD SECTION RIGHT SIDE

1.

WINDSHIELD AFT SECTION LEFT SIDE

0.					
0.	0.	1.	0.	0.	0.
0.	1.	1.			
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.		
6.					
72.	0.	72.	66.	-31.75	60.
60.	-41.57	48.	48.	-48.	24.
48.	-37.47	54.	48.	0.	72.

WINDSHIELD AFT SECTION RIGHT SIDE

1.

LOWER FRONT PANEL LEFT SIDE

0.					
1.	0.	1.	0.	0.	0.
1.	1.	1.			
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.		
6.					
48.	-41.57	0.	30.	-37.47	0.
8.2	-12.	0.	18.6	-12.	-12.
48.	-12.	-22.48	48.	-37.47	-6.

LOWER FRONT PANEL RIGHT SIDE

1.

Figure A-5. Input for Case II (Windshield Modified); Card Images (Sheet 1 of 2).

FORWARD SIDE PANEL LEFT SIDE

0.	0.	1.	0.	0.	0.
0.	1.	1.			
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.		
6.					
72.	-48.	24.	96.	-48.	24.
96.	-44.5	42.	96.	-31.75	60.
84.	-31.75	60.	72.	-46.48	36.

FORWARD SIDE PANEL RIGHT SIDE

1.

AFT SIDE PANEL LEFT SIDE

0.					
0.	0.	1.	0.	0.	0.
0.	1.	1.			
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.		
6.					
108.	-48.	24.	144.	-48.	24.
144.	-44.5	42.	144.	-31.75	60.
108.	-31.75	60.	108.	-44.5	42.

AFT SIDE PANEL RIGHT SIDE

1.

Figure A-5. Input for Case II (Windshield Modified); Card Images (Sheet 2 of 2).



CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* INPUT DATA \*\*\*

**CONTROL OPTIONS		PRINT OPTION		2.	
DEFAULT OPTION	0.	PROBABILITY OPT	1.		
**AIRCRAFT INITIAL EULER ORIENTATION		ROLL		0.0	
PITCH	0.0	YAW	-45.0		
**SELECTED YAW ANGLE ROTATIONS		INITIAL ANGLE		-45.0	
NO. OF ANGLES	2.	ANGLE INCREMENT	90.0		
**SELECTED SUN ELEVATIONS		INITIAL ANGLE		0.0	
NO. OF ANGLES	1.	ANGLE INCREMENT	0.0		
**REFERENCE INFORMATION FOR MEASURING SUN GLINT ANGLES					
REFERENCE POINT FOR MEASURING ANGLES OF GLINT SIGNATURE					
X	114.00	Y	0.0	Z	18.00
DISTANCE AT WHICH GLINT SIGNATURE FORMED (FT.) 1500.000					
**PLOT SCALING					
GLINT AZIMUTH		GLINT ELEVATION			
MINIMUM	-180.0	MINIMUM	-10.0		
MAXIMUM	180.0	MAXIMUM	10.0		
**BOUNDARIES FOR CALCULATING PROBABILITY					
GLINT AZIMUTH		GLINT ELEVATION			
MINIMUM	-180.0	MINIMUM	-10.0		
MAXIMUM	180.0	MAXIMUM	10.0		

CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* INPUT DATA \*\*\*

\*\*REFLECTIVE SURFACE DATA  
NO. OF SURFACES 8.

\*REFLECTIVE SURFACE NO. 1 IDENTIFICATION: LEFT SIDE OF WINDSHIELD

CURVE-FIT INPUT DATA

DESIRED TERMS FOR CURVE-FITTING

(1) X TERM	(2) Y TERM	(3) Z TERM	(4) XY TERM	(5) XZ TERM	(6) YZ TERM
1.	0.	1.	0.	0.	0.
(6) YZ TERM	(7) XSO TERM	(8) YSO TERM	(9) ZSO TERM	(10) XZ TERM	(11) YZ TERM
0.	1.	1.	1.	0.	1.

INPUT VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF	(2) Y COEF	(3) Z COEF	(4) XY COEF	(5) XZ COEF	(6) YZ COEF
0.0	0.0	0.0	0.0	0.0	0.0
(4) XY COEF	(5) XZ COEF	(6) YZ COEF	(7) XSO COEF	(8) YSO COEF	(9) ZSO COEF
0.0	0.0	0.0	0.0	0.0	0.0
(7) XSO COEF	(8) YSO COEF	(9) ZSO COEF	(10) XZ COEF	(11) YZ COEF	(12) YZ COEF
0.0	0.0	0.0	0.0	0.0	0.0
(10) XZ COEF	(11) YZ COEF	(12) YZ COEF	(13) XZ COEF	(14) YZ COEF	(15) YZ COEF
0.0	0.0	0.0	0.0	0.0	0.0

BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)

X	Y	Z	X	Y	Z
(1) 72.00	0.0	72.00	(2) 66.00	-31.75	60.00
(4) 48.00	-48.00	24.00	(5) 16.25	-36.00	24.00
(7) 0.0	0.0	24.00	(8) 6.43	0.0	48.00
(10) 48.00	0.0	72.00	(11) 48.00	-37.47	54.00

\*REFLECTIVE SURFACE NO. 2 IDENTIFICATION: RIGHT SIDE OF WINDSHIELD

CURVE-FIT INPUT DATA

DESIRED TERMS FOR CURVE-FITTING

(1) X TERM	(2) Y TERM	(3) Z TERM	(4) XY TERM	(5) XZ TERM	(6) YZ TERM
1.	0.	1.	0.	0.	0.
(6) YZ TERM	(7) XSO TERM	(8) YSO TERM	(9) ZSO TERM	(10) XZ TERM	(11) YZ TERM
0.	1.	1.	1.	0.	1.

INPUT VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF	(2) Y COEF	(3) Z COEF	(4) XY COEF	(5) XZ COEF	(6) YZ COEF
0.0	0.0	0.0	0.0	0.0	0.0
(4) XY COEF	(5) XZ COEF	(6) YZ COEF	(7) XSO COEF	(8) YSO COEF	(9) ZSO COEF
0.0	0.0	0.0	0.0	0.0	0.0
(7) XSO COEF	(8) YSO COEF	(9) ZSO COEF	(10) XZ COEF	(11) YZ COEF	(12) YZ COEF
0.0	0.0	0.0	0.0	0.0	0.0
(10) XZ COEF	(11) YZ COEF	(12) YZ COEF	(13) XZ COEF	(14) YZ COEF	(15) YZ COEF
0.0	0.0	0.0	0.0	0.0	0.0

BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)

X	Y	Z	X	Y	Z
(1) 72.00	0.0	72.00	(2) 66.00	31.75	60.00
(4) 48.00	48.00	24.00	(5) 16.25	36.00	24.00
(7) 0.0	0.0	24.00	(8) 6.43	0.0	48.00
(10) 48.00	0.0	72.00	(11) 48.00	37.47	54.00

CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* INPUT DATA \*\*\*

\*REFLECTIVE SURFACE NO. 3 IDENTIFICATION: LOWER FRONT PANEL LEFT SIDE

CURVE-FIT INPUT DATA

DESIRED TERMS FOR CURVE-FITTING

(1) X TERM	(2) Y TERM	(3) Z TERM	(4) XY TERM	(5) XZ TERM	(6) YZ TERM	(7) XSQ TERM	(8) YSQ TERM	(9) ZSQ TERM
1.	0.	1.	1.	0.	0.	1.	1.	1.

INPUT VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF	(2) Y COEF	(3) Z COEF	(4) XY COEF	(5) XZ COEF	(6) YZ COEF	(7) XSQ COEF	(8) YSQ COEF	(9) ZSQ COEF
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)

	X	Y	Z	X	Y	Z
(1)	48.00	-41.57	0.0	(2)	30.00	-37.47
(4)	18.60	-12.00	-12.00	(5)	48.00	-12.00
				(6)	48.00	-37.47
				(3)	8.20	-12.00
				(6)	48.00	-37.47
						0.0
						-6.00

\*REFLECTIVE SURFACE NO. 4 IDENTIFICATION: LOWER FRONT PANEL RIGHT SIDE

CURVE-FIT INPUT DATA

DESIRED TERMS FOR CURVE-FITTING

(1) X TERM	(2) Y TERM	(3) Z TERM	(4) XY TERM	(5) XZ TERM	(6) YZ TERM	(7) XSQ TERM	(8) YSQ TERM	(9) ZSQ TERM
1.	0.	0.	1.	0.	0.	1.	1.	1.

INPUT VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF	(2) Y COEF	(3) Z COEF	(4) XY COEF	(5) XZ COEF	(6) YZ COEF	(7) XSQ COEF	(8) YSQ COEF	(9) ZSQ COEF
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)

	X	Y	Z	X	Y	Z
(1)	48.00	41.57	0.0	(2)	30.00	37.47
(4)	18.60	12.00	-12.00	(5)	48.00	12.00
				(6)	48.00	37.47
				(3)	8.20	12.00
				(6)	48.00	37.47
						0.0
						-6.00

\*REFLECTIVE SURFACE NO. 5 IDENTIFICATION: FORWARD SIDE PANEL LEFT SIDE

CURVE-FIT INPUT DATA

DESIRED TERMS FOR CURVE-FITTING

(1) X TERM	(2) Y TERM	(3) Z TERM	(4) XY TERM	(5) XZ TERM	(6) YZ TERM	(7) XSQ TERM	(8) YSQ TERM	(9) ZSQ TERM
0.	0.	0.	1.	0.	0.	1.	1.	1.

CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* INPUT DATA \*\*\*

REFLECTIVE SURFACE NO. 5 IDENTIFICATION: FORWARD SIDE PANEL LEFT SIDE

INPUT VALUES FOR COEFFICIENTS OF SURFACE  
 (1) X COEF 0.0 (2) Y COEF 0.0 (3) Z COEF 0.0  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSO COEF 0.0 (8) YSO COEF 0.0 (9) ZSO COEF 0.0  
 (10) CONSTANT 0.0

BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)

	X	Y	Z	X	Y	Z
(1)	72.00	-48.00	24.00	(2)	96.00	-48.00
(4)	96.00	-31.75	60.00	(5)	84.00	-31.75
				(6)	72.00	-46.48
				(3)	96.00	-44.50
				(6)	72.00	-46.48
						42.00
						36.00

REFLECTIVE SURFACE NO. 6 IDENTIFICATION: FORWARD SIDE PANEL RIGHT SIDE

CURVE-FIT INPUT DATA

DESIRED TERMS FOR CURVE-FITTING

	(1) X TERM	(2) Y TERM	(3) Z TERM	(4) XY TERM	(5) XZ TERM	(6) YZ TERM
(6) YZ TERM	0.0	(7) XSO TERM	0.0	(8) YSO TERM	1.0	(9) ZSO TERM
						1.0

INPUT VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF 0.0 (2) Y COEF 0.0 (3) Z COEF 0.0  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSO COEF 0.0 (8) YSO COEF 0.0 (9) ZSO COEF 0.0  
 (10) CONSTANT 0.0

BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)

	X	Y	Z	X	Y	Z
(1)	72.00	48.00	24.00	(2)	96.00	48.00
(4)	96.00	31.75	60.00	(5)	84.00	31.75
				(6)	72.00	44.50
				(3)	96.00	44.50
				(6)	72.00	46.48
						42.00
						36.00

REFLECTIVE SURFACE NO. 7 IDENTIFICATION: AFT SIDE PANEL LEFT SIDE

CURVE-FIT INPUT DATA

DESIRED TERMS FOR CURVE-FITTING

	(1) X TERM	(2) Y TERM	(3) Z TERM	(4) XY TERM	(5) XZ TERM	(6) YZ TERM
(6) YZ TERM	0.0	(7) XSO TERM	0.0	(8) YSO TERM	1.0	(9) ZSO TERM
						1.0

INPUT VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF 0.0 (2) Y COEF 0.0 (3) Z COEF 0.0  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSO COEF 0.0 (8) YSO COEF 0.0 (9) ZSO COEF 0.0  
 (10) CONSTANT 0.0



CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* INPUT DATA \*\*\*

REFLECTIVE SURFACE NO. 7 IDENTIFICATION: AFT SIDE PANEL LEFT SIDE

BOUNDARY POINTS -- BODY AXES (STATIONLINE,BUTTLINE,WATERLINE)

	X	Y	Z	X	Y	Z
( 1 )	108.00	-48.00	24.00	( 2 )	144.00	-48.00
( 4 )	144.00	-31.75	60.00	( 5 )	108.00	-31.75
( 3 )	144.00					
( 6 )	108.00					

REFLECTIVE SURFACE NO. 8 IDENTIFICATION: AFT SIDE PANEL RIGHT SIDE

CURVE-FIT INPUT DATA

DESIRED TERMS FOR CURVE-FITTING

(1) X	TERM	0.	(2) Y	TERM	0.	(3) Z	TERM	1.	(4) XY	TERM	0.	(5) XZ	TERM	0.
(6) YZ	TERM	0.	(7) XSQ	TERM	0.	(8) YSQ	TERM	1.	(9) ZSQ	TERM	1.			

INPUT VALUES FOR COEFFICIENTS OF SURFACE

(1) X	COEF	0.0	(2) Y	COEF	0.0	(3) Z	COEF	0.0
(4) XY	COEF	0.0	(5) XZ	COEF	0.0	(6) YZ	COEF	0.0
(7) XSQ	COEF	0.0	(8) YSQ	COEF	0.0	(9) ZSQ	COEF	0.0
(10) CONSTANT	0.0							

BOUNDARY POINTS -- BODY AXES (STATIONLINE,BUTTLINE,WATERLINE)

	X	Y	Z	X	Y	Z
( 1 )	108.00	48.00	24.00	( 2 )	144.00	48.00
( 4 )	144.00	31.75	60.00	( 5 )	108.00	31.75
( 3 )	144.00					
( 6 )	108.00					

CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* RESULTS OF CURVE-FIT ANALYSIS \*\*\*

\*\*REFLECTIVE SURFACE DATA

• REFLECTIVE SURFACE NO. 1 IDENTIFICATION: LEFT SIDE OF WINDSHIELD

VALUES FOR COEFFICIENTS OF SURFACE  
 (1) X COEF 0.4071E-01 (2) Y COEF 0.0 (3) Z COEF -0.2472E-02  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSO COEF 0.2459E-03 (8) YSO COEF 0.1683E-03 (9) ZSO COEF 0.1596E-03  
 (10) CONSTANT 0.1000E 01

ROOT MEAN SQUARE ERROR OF FIT= 0.6609E-01

• REFLECTIVE SURFACE NO. 2 IDENTIFICATION: RIGHT SIDE OF WINDSHIELD

VALUES FOR COEFFICIENTS OF SURFACE  
 (1) X COEF 0.4071E-01 (2) Y COEF 0.0 (3) Z COEF -0.2472E-02  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSO COEF 0.2459E-03 (8) YSO COEF 0.1683E-03 (9) ZSO COEF 0.1596E-03  
 (10) CONSTANT 0.1000E 01

ROOT MEAN SQUARE ERROR OF FIT= 0.6609E-01

• REFLECTIVE SURFACE NO. 3 IDENTIFICATION: LOWER FRONT PANEL LEFT SIDE

VALUES FOR COEFFICIENTS OF SURFACE  
 (1) X COEF 0.6319E-01 (2) Y COEF 0.0 (3) Z COEF -0.5735E-02  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSO COEF 0.4787E-03 (8) YSO COEF 0.4786E-03 (9) ZSO COEF 0.4786E-03  
 (10) CONSTANT 0.1000E 01

ROOT MEAN SQUARE ERROR OF FIT= 0.2958E-04

• REFLECTIVE SURFACE NO. 4 IDENTIFICATION: LOWER FRONT PANEL RIGHT SIDE

VALUES FOR COEFFICIENTS OF SURFACE  
 (1) X COEF 0.6319E-01 (2) Y COEF 0.0 (3) Z COEF -0.5735E-02  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSO COEF 0.4787E-03 (8) YSO COEF 0.4786E-03 (9) ZSO COEF 0.4786E-03  
 (10) CONSTANT 0.1000E 01

ROOT MEAN SQUARE ERROR OF FIT= 0.2958E-04

CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* RESULTS OF CURVE-FIT ANALYSIS \*\*\*

REFLECTIVE SURFACE DATA

REFLECTIVE SURFACE NO. 5 IDENTIFICATION: FORWARD SIDE PANEL LEFT SIDE

VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF	0.0	(2) Y COEF	0.0	(3) Z COEF	-0.5312E-02
(4) XY COEF	0.0	(5) XZ COEF	0.0	(6) YZ COEF	0.0
(7) XSQ COEF	0.0	(8) YSQ COEF	0.4410E-03	(9) ZSQ COEF	0.4414E-03
(10) CONSTANT	-0.1000E 01				

ROOT MEAN SQUARE ERROR OF FIT= 0.2322E-04

REFLECTIVE SURFACE NO. 6 IDENTIFICATION: FORWARD SIDE PANEL RIGHT SIDE

VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF	0.0	(2) Y COEF	0.0	(3) Z COEF	-0.5312E-02
(4) XY COEF	0.0	(5) XZ COEF	0.0	(6) YZ COEF	0.0
(7) XSQ COEF	0.0	(8) YSQ COEF	0.4410E-03	(9) ZSQ COEF	0.4414E-03
(10) CONSTANT	-0.1000E 01				

ROOT MEAN SQUARE ERROR OF FIT= 0.2322E-04

REFLECTIVE SURFACE NO. 7 IDENTIFICATION: AFT SIDE PANEL LEFT SIDE

VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF	0.0	(2) Y COEF	0.0	(3) Z COEF	-0.5307E-02
(4) XY COEF	0.0	(5) XZ COEF	0.0	(6) YZ COEF	0.0
(7) XSQ COEF	0.0	(8) YSQ COEF	0.4410E-03	(9) ZSQ COEF	0.4413E-03
(10) CONSTANT	-0.1000E 01				

ROOT MEAN SQUARE ERROR OF FIT= 0.4186E-15

REFLECTIVE SURFACE NO. 8 IDENTIFICATION: AFT SIDE PANEL RIGHT SIDE

VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF	0.0	(2) Y COEF	0.0	(3) Z COEF	-0.5307E-02
(4) XY COEF	0.0	(5) XZ COEF	0.0	(6) YZ COEF	0.0
(7) XSQ COEF	0.0	(8) YSQ COEF	0.4410E-03	(9) ZSQ COEF	0.4413E-03
(10) CONSTANT	-0.1000E 01				

ROOT MEAN SQUARE ERROR OF FIT= 0.4186E-15

## CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 1 IDENTIFICATION: LEFT SIDE OF WINDSHIELD

SUN ELEVATION 0.0  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

XROT 114.00  
YROT 0.0  
ZROT 18.00  
DISTG 1500.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTLINE, WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INTRFL	ISHAD	INTRF	AZIMUTH	ELEVATION
-45.00	72.00	0.0	72.00	1	0	0	-127.88	-49.47
-45.00	66.00	-31.75	60.00	1	0	0	-9.67	-62.74
-45.00	60.00	-41.57	48.00	1	0	0	29.73	-40.74
-45.00	48.00	-48.00	24.00	1	0	0	71.22	2.86
-45.00	16.25	-36.00	24.00	0	0	0	-173.25	-0.16
-45.00	6.43	-24.00	24.00	0	0	0	-136.68	-1.01
-45.00	0.0	0.0	24.00	0	0	0	-89.77	-1.82
-45.00	6.43	0.0	48.00	0	0	0	-36.39	25.64
-45.00	16.25	0.0	60.00	0	0	0	-117.14	-42.19
-45.00	48.00	0.0	72.00	1	0	0	-177.52	-15.79
-45.00	48.00	-37.47	54.00	1	0	0	89.12	-48.95
45.00	72.00	0.0	72.00	1	0	0	127.88	-49.47
45.00	66.00	-31.75	60.00	1	0	0	175.62	-2.53
45.00	60.00	-41.57	48.00	0	0	0	-157.47	8.69
45.00	48.00	-48.00	24.00	0	0	0	-108.53	-2.01
45.00	16.25	-36.00	24.00	0	0	0	6.55	-3.09
45.00	6.43	-24.00	24.00	0	0	0	42.96	-2.58
45.00	0.0	0.0	24.00	0	0	0	99.77	-1.82
45.00	6.43	0.0	48.00	0	0	0	96.39	25.64
45.00	16.25	0.0	60.00	0	0	0	117.14	42.15
45.00	48.00	0.0	72.00	1	0	0	177.52	-15.79
45.00	48.00	-37.47	54.00	0	0	0	-130.87	29.57



CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 2 IDENTIFICATION: RIGHT SIDE OF WINDSHIELD

SUN ELEVATION 0.0  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

XROT 114.00  
YROT 0.0  
ZROT 18.00  
DISTG 1500.00

A/C YAW	BOUNDARY POINTS --- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INRFL	ISHAD	INTRF	AZIMUTH	ELEVATION
-45.00	72.00	0.0	72.00	1	0	0	-127.88	-44.47
-45.00	66.00	31.75	60.00	1	0	0	-175.62	-2.53
-45.00	60.00	41.57	48.00	0	0	0	157.47	8.69
-45.00	48.00	48.00	24.00	0	0	0	108.53	-2.01
-45.00	16.25	36.00	24.00	0	0	0	-6.55	-3.09
-45.00	6.43	24.00	24.00	0	0	0	-42.96	-2.58
-45.00	3.0	0.0	24.00	0	0	0	-89.77	-1.82
-45.00	6.43	0.0	48.00	0	0	0	-96.39	25.64
-45.00	16.25	0.0	60.00	0	0	0	-117.14	42.15
-45.00	48.00	0.0	72.00	1	0	0	-177.52	-15.79
-45.00	48.00	37.47	54.00	0	0	0	130.87	29.57
45.00	72.00	0.0	72.00	1	0	0	127.88	-44.47
45.00	66.00	31.75	60.00	1	0	0	9.67	-62.74
45.00	60.00	41.57	48.00	1	0	0	-29.73	-40.74
45.00	48.00	48.00	24.00	1	0	0	-71.22	2.86
45.00	16.25	36.00	24.00	0	0	0	173.25	-0.16
45.00	6.43	24.00	24.00	0	0	0	136.68	-1.01
45.00	0.0	0.0	24.00	0	0	0	89.77	-1.82
45.00	6.43	0.0	48.00	0	0	0	96.39	25.64
45.00	16.25	0.0	60.00	0	0	0	117.14	42.15
45.00	48.00	0.0	72.00	1	0	0	177.52	-15.79
45.00	48.00	37.47	54.00	1	0	0	-49.12	-48.95

CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 3 IDENTIFICATION: LOWER FRONT PANEL LEFT SIDE

SUN ELEVATION 0.0  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INRFL	ISHAD	INTRP	AZIMUTH	ELEVATION
-45.00	48.00	-41.57	0.0	1	0	0	108.44	37.84
-45.00	30.00	-37.47	0.0	1	0	0	150.88	16.68
-45.00	8.20	-12.00	0.0	0	0	0	-136.41	-24.21
-45.00	18.60	-12.00	-12.00	0	0	0	-159.91	-22.72
-45.00	48.00	-12.00	-22.48	1	0	0	176.35	19.96
-45.00	48.00	-37.47	-6.00	1	0	0	122.71	43.70
45.00	48.00	-41.57	0.0	0	0	0	-108.22	-37.85
45.00	30.00	-37.47	0.0	0	0	0	-54.12	-54.77
45.00	8.20	-12.00	0.0	0	0	0	75.03	-49.61
45.00	18.60	-12.00	-12.00	0	0	0	129.00	-66.18
45.00	48.00	-12.00	-22.48	0	0	0	-176.29	-20.19
45.00	48.00	-37.47	-6.00	0	0	0	-122.49	-43.75

XR07 114.00  
YR07 0.0  
ZR07 18.00  
DISTG 1500.00

CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 4 IDENTIFICATION: LOWER FRONT PANEL RIGHT SIDE

SUN ELEVATION 0.0  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

XROT 114.00  
YROT 0.0  
ZROT 18.00  
DISTG 1500.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, OUTLINE, WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INREL	ISHAD	INIRF	AZIMUTH	ELEVATION
-45.00	48.00	41.57	0.0	0	0	0	108.22	-37.85
-45.00	30.00	37.47	0.0	0	0	0	54.12	-54.77
-45.00	8.20	12.00	0.0	0	0	0	-75.03	-49.81
-45.00	18.60	12.00	-12.00	0	0	0	-129.00	-66.18
-45.00	48.00	12.00	-22.48	0	0	0	176.29	-20.19
-45.00	48.00	37.47	-6.00	0	0	0	122.49	-43.75
45.00	48.00	41.57	0.0	1	0	0	-108.44	37.84
45.00	30.00	37.47	0.0	1	0	0	-150.88	16.68
45.00	8.20	12.00	0.0	0	0	0	136.41	-24.21
45.00	18.60	12.00	-12.00	0	0	0	159.91	-22.72
45.00	48.00	12.00	-22.48	1	0	0	-176.35	19.96
45.00	48.00	37.47	-6.00	1	0	0	-122.71	43.70

CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 5 IDENTIFICATION: FORWARD SIDE PANEL LEFT SIDF

SUN ELEVATION 0.0  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

KROT 114.00  
YROT 0.0  
ZROT 18.00  
DISTG 1500.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE,BUTLINE,WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INRFL	ISMAD	INTRF	AZIMUTH	ELEVATION
-45.00	72.00	-48.00	24.00	1	0	0	90.01	0.05
-45.00	96.00	-48.00	24.00	1	0	0	90.07	0.05
-45.00	96.00	-44.50	42.00	1	0	0	99.37	-29.44
-45.00	96.00	-31.75	60.00	1	0	0	142.26	-44.50
-45.00	84.00	-31.75	60.00	1	0	0	142.26	-44.52
-45.00	72.00	-46.48	36.00	1	0	0	93.83	-20.02
45.00	72.00	-48.00	24.00	0	0	0	-89.80	-0.01
45.00	96.00	-48.00	24.00	0	0	0	-89.85	-0.01
45.00	96.00	-44.50	42.00	0	0	0	-95.14	29.49
45.00	96.00	-31.75	60.00	0	0	0	-142.05	44.65
45.00	84.00	-31.75	60.00	0	0	0	-142.06	44.67
45.00	72.00	-46.48	36.00	0	0	0	-93.61	20.06



CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

REFLECTIVE SURFACE NO. 5 \*\*\* SUN GLINT SIGNATURE \*\*\*  
 IDENTIFICATION: FORWARD SIDE PANEL RIGHT SIDE

SUN ELEVATION 0.0  
 A/C PITCH ATTITUDE 0.0  
 A/C ROLL ATTITUDE 0.0

XROT 114.00  
 YROT 0.0  
 ZROT 18.30  
 DISTG 1500.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INRFL	ISHAD	INTSF	AZIMUTH	ELEVATION
-45.00	72.00	48.00	24.00	0	0	0	89.80	-0.01
-45.00	96.00	48.00	24.00	0	0	0	39.85	-0.01
-45.00	96.00	44.50	42.00	0	0	0	99.14	29.49
-45.00	96.00	31.75	60.00	0	0	0	142.05	44.65
-45.00	84.00	31.75	60.00	0	0	0	142.06	44.67
-45.00	72.00	46.48	36.00	0	0	0	93.61	20.06
45.00	72.00	48.00	24.00	1	0	0	-90.01	0.05
45.00	96.00	48.00	24.00	1	0	0	-90.07	0.05
45.00	96.00	44.50	42.00	1	0	0	-99.37	-29.44
45.00	96.00	31.75	60.00	1	0	0	-142.26	-44.50
45.00	84.00	31.75	60.00	1	0	0	-142.26	-44.52
45.00	72.00	46.48	36.00	1	0	0	-93.83	-20.02

CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 7										IDENTIFICATION: AFT SIDE PANEL LEFT SIDE									
SUN ELEVATION					0.0					XROT					114.00				
A/C PITCH ATTITUDE					0.0					YROT					0.0				
A/C ROLL ATTITUDE					0.0					ZROT					18.00				
										DISTG					1500.00				
A/C YAW										GLINT									
										AZIMUTH ELEVATION									
BOUNDARY POINTS -- BODY AXES										STATUS FLAGS FOR POINTS									
(STATIONLINE,BUTLINE,WATERLINE)										1HRFL 1SHAD 1INTRF									
X Y Z																			
-45.00	108.00	-48.00	24.00	1	0	0	0	0	0	90.09	0.04								
-45.00	144.00	-48.00	24.00	1	0	0	0	0	0	90.18	0.04								
-45.00	144.00	-44.50	42.00	1	0	0	0	0	0	99.46	-29.39								
-45.00	144.00	-31.75	60.00	1	0	0	0	0	0	142.23	-44.43								
-45.00	108.00	-31.75	60.00	1	0	0	0	0	0	142.24	-44.49								
-45.00	108.00	-44.50	42.00	1	0	0	0	0	0	99.40	-29.43								
45.00	108.00	-48.00	24.00	0	0	0	0	0	0	-89.88	-0.00								
45.00	144.00	-48.00	24.00	0	0	0	0	0	0	-89.96	-0.00								
45.00	144.00	-44.50	42.00	0	0	0	0	0	0	-99.23	29.43								
45.00	144.00	-31.75	60.00	0	0	0	0	0	0	-142.03	44.58								
45.00	108.00	-31.75	60.00	0	0	0	0	0	0	-142.04	44.63								
45.00	108.00	-44.50	42.00	0	0	0	0	0	0	-99.17	-29.47								

CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 8 IDENTIFICATION: AFT SIDE PANEL RIGHT SIDE

SUN ELEVATION 0.0  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

XROT 114.00  
YROT 0.0  
ZROT 18.00  
DISTG 1500.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INRFL	ISHAD	INTRF	AZIMUTH	ELEVATION
-45.00	108.00	48.00	24.00	0	0	0	89.88	-8.00
-45.00	144.00	48.00	24.00	0	0	0	89.96	-0.00
-45.00	144.00	44.50	42.00	0	0	0	99.23	29.43
-45.00	144.00	31.75	60.00	0	0	0	142.03	44.58
-45.00	108.00	31.75	60.00	0	0	0	142.04	44.63
-45.00	108.00	44.50	42.00	0	0	0	99.17	29.47
45.00	108.00	48.00	24.00	1	0	0	-90.09	0.04
45.00	144.00	48.00	24.00	1	0	0	-90.18	0.04
45.00	144.00	44.50	42.00	1	0	0	-99.46	-29.39
45.00	144.00	31.75	60.00	1	0	0	-142.23	-44.43
45.00	108.00	31.75	60.00	1	0	0	-142.24	-44.49
45.00	108.00	44.50	42.00	1	0	0	-99.46	-29.43

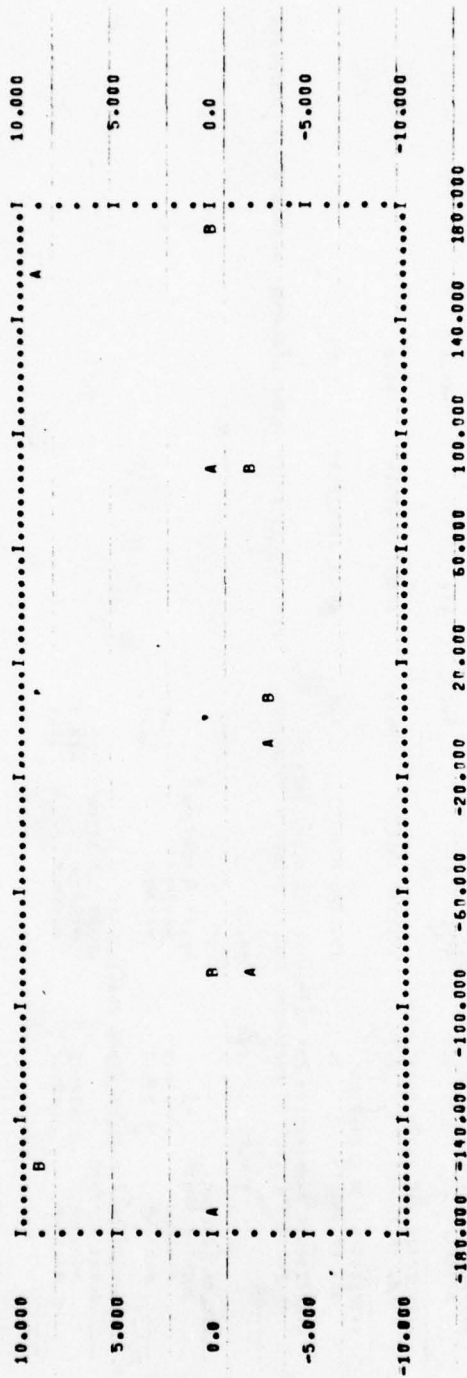
CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

SUN GLINT SIGNATURE

SUN ELEVATION 0.0  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

OBSERVER ANGLE  
DEGREES

OBSERVER ANGLE  
DEGREES



GLINT AZIMUTH WITH RESPECT TO SUN - DEGREES

PROBABILITY: 0.556

KEY TO PLOT SYMBOLS

SYMBOL	A/C HEADING (DEG)	SYMBOL	A/C HEADING (DEG)
A	-45.00	F	
B	45.00	G	
C		K	
D		M	
E			



CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* INPUT DATA \*\*\*

--CONTROL OPTIONS  
 DEFAULT OPTION 0. PRINT OPTION 2.  
 PLOT OPTION 2. PROBABILITY OPT 1.

--AIRCRAFT INITIAL EULER ORIENTATION  
 PITCH 0.0 ROLL 0.0 YAW -45.0

--SELECTED YAW ANGLE ROTATIONS  
 NO. OF ANGLES 2. INITIAL ANGLE -45.0 ANGLE INCREMENT 90.0

--SELECTED SUN ELEVATIONS  
 NO. OF PANELS 1. INITIAL ANGLE 0.0 ANGLE INCREMENT 0.0

--REFERENCE INFORMATION FOR MEASURING SUN GLINT ANGLES  
 REFERENCE POINT FOR MEASURING ANGLES OF GLINT SIGNATURE  
 X 114.00 Y 0.0 Z 18.00  
 DISTANCE AT WHICH GLINT SIGNATURE FORMED (FT.) 1500.000

--PLOT SCALING  
 GLINT AZIMUTH  
 MINIMUM -180.0 CLINT ELEVATION -10.0  
 MAXIMUM 180.0 MAXIMUM 10.0

--BOUNDARIES FOR CALCULATING PROBABILITY  
 GLINT AZIMUTH  
 MINIMUM -180.0 GLINT ELEVATION -10.0  
 MAXIMUM 180.0 MAXIMUM 10.0

... INPUT DATA ...

REFLECTIVE SURFACE NO. 1 IDENTIFICATION: WINDSHIELD FORWARD SECTION LEFT SIDE

**CURVE-FIT INPUT DATA**

### DESIRED TERMS FOR CURVE-FITTING

	(1) X	TERM	1.	(2) Y	TERM	0.	(3) Z	TERM	1.	(4) XY	TERM	0.
(6) YZ	TERM	0.	(7) XQ	TERM	1.	(A) YQ	TERM	1.	(9) ZQ	TERM	1.	

### INPUT VALUES FOR COEFFICIENTS OF SURFACE

	(1)	X	COEF	0.0	(2)	Y	COEF	0.0	(3)	Z	COEF	0.0
	(4)	XY	COEF	0.0	(5)	XZ	COEF	0.0	(6)	YZ	COEF	0.0
	(7)	XSQ	COEF	0.0	(8)	YSQ	COEF	0.0	(9)	ZSQ	COEF	0.0

BOUNDARY POINTS -- BODY AXFS (STATIONLINE,BUTTLINE,WATERLINE)

	X	Y	Z
(3)	6.43	-24.00	24.00
(6)	16.25	0.0	60.00

REFLECTIVE SURFACE NO. 2

**CURVE-FIT INPUT DATA**

# DESIRED TERMS FOR CURVE-FITTING

	(1) X	TERM	1.	(2) Y	TERM	0.	(3) Z	TERM	1.	(4) XY	TERM	0.	
	(6) YZ	TERM	0.	(7)	M3L GSG	1.	(8) YSG	TERM	1.	(9)	ZSG	TERM	1.

### INPUT VALUES FOR COEFFICIENTS OF SURFACE

(1)	X		COEF	0.0		(2)	V		COEF	0.0		(3)	Z		COEF	0.0
(4)	XY		COEF	0.0		(5)	YZ		COEF	0.0		(6)	YZ		COEF	0.0
(7)	XSQ		COEF	0.0		(8)	YSQ		COEF	0.0		(9)	ZSQ		COEF	0.0

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BOUNDARY POINTS -- BODY AXES (STATION! INF. BUUTT! INF. WATER! INF.)

	X	Y	Z
(3)	6.43	24.00	24.00
(6)	16.25	0.0	60.00

REFLECTIVE SURFACE NO. 3 IDENTIFICATION: WINDSHIELD AFT SECTION LEFT SIDE

CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* INPUT DATA \*\*\*

REFLECTIVE SURFACE NO. 3 IDENTIFICATION: WINDSHIELD AFT SECTION LEFT SIDE

CURVE-FIT INPUT DATA

DESIRED TERMS FOR CURVE-FITTING

(1) X TERM	0.	(2) Y TERM	0.	(3) Z TERM	1.	(4) XY TERM	0.	(5) XZ TERM	0.
(6) YZ TERM	0.	(7) XSO TERM	0.	(8) YSO TERM	1.	(9) ZSO TERM	1.		

INPUT VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF	0.0	(2) Y COEF	0.0	(3) Z COEF	0.0
(4) XY COEF	0.0	(5) XZ COEF	0.0	(6) YZ COEF	0.0
(7) XSO COEF	0.0	(8) YSO COEF	0.0	(9) ZSO COEF	0.0
(10) CONSTANT	0.0				

BOUNDARY POINTS -- BODY AXES (STATIONLINE, PUTLINE, WATERLINE)

(1) X	72.00	Y	0.0	Z	0.0
(2) X	48.00	Y	-48.00	Z	48.00
(3) X	72.00	Y	0.0	Z	72.00
(4) X	48.00	Y	-48.00	Z	48.00

REFLECTIVE SURFACE NO. 4 IDENTIFICATION: WINDSHIELD AFT SECTION RIGHT SIDE

CURVE-FIT INPUT DATA

DESIRED TERMS FOR CURVE-FITTING

(1) X TERM	0.	(2) Y TERM	0.	(3) Z TERM	1.	(4) XY TERM	0.	(5) XZ TERM	0.
(6) YZ TERM	0.	(7) XSO TERM	0.	(8) YSO TERM	1.	(9) ZSO TERM	1.		

INPUT VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF	0.0	(2) Y COEF	0.0	(3) Z COEF	0.0
(4) XY COEF	0.0	(5) XZ COEF	0.0	(6) YZ COEF	0.0
(7) XSO COEF	0.0	(8) YSO COEF	0.0	(9) ZSO COEF	0.0
(10) CONSTANT	0.0				

BOUNDARY POINTS -- BODY AXES (STATIONLINE, PUTLINE, WATERLINE)

(1) X	72.00	Y	0.0	Z	0.0
(2) X	48.00	Y	-48.00	Z	48.00
(3) X	72.00	Y	0.0	Z	72.00
(4) X	48.00	Y	-48.00	Z	48.00

REFLECTIVE SURFACE NO. 5 IDENTIFICATION: LOWER FRONT PANEL LEFT SIDE

CURVE-FIT INPUT DATA

DESIRED TERMS FOR CURVE-FITTING

(1) X TERM	1.	(2) Y TERM	0.	(3) Z TERM	1.	(4) XY TERM	0.	(5) XZ TERM	0.
(6) YZ TERM	0.	(7) XSO TERM	1.	(8) YSO TERM	1.	(9) ZSO TERM	1.		

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CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* INPUT DATA \*\*\*

REFLECTIVE SURFACE NO. 5 IDENTIFICATION: LOWER FRONT PANEL LEFT SIDE

INPUT VALUES FOR COEFFICIENTS OF SURFACE  
 (1) X COEF 0.0 (2) Y COEF 0.0 (3) Z COEF 0.0  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSO COEF 0.0 (8) YSO COEF 0.0 (9) ZSO COEF 0.0  
 (10) CONSTANT 0.0

BOUNDARY POINTS -- BODY AXES (STATIONLINE, PUTLINE, WATERLINE)

	X	Y	Z	X	Y	Z
(1)	48.00	-41.57	0.0	(2)	30.00	-27.47
(4)	18.60	-12.00	-12.00	(5)	48.00	-12.00
						-22.48

REFLECTIVE SURFACE NO. 6 IDENTIFICATION: LOWER FRONT PANEL RIGHT SIDE

CURVE-FIT INPUT DATA

DESIRED TERMS FOR CURVE-FITTING

(1) X TERM	(2) Y TERM	(3) Z TERM	(4) XY TERM	(5) XZ TERM
1.0	1.0	1.0	1.0	1.0

INPUT VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF 0.0 (2) Y COEF 0.0 (3) Z COEF 0.0  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) YSO COEF 0.0 (8) YSO COEF 0.0 (9) ZSO COEF 0.0  
 (10) CONSTANT 0.0

BOUNDARY POINTS -- BODY AXES (STATIONLINE, PUTLINE, WATERLINE)

	X	Y	Z	X	Y	Z
(1)	48.00	41.57	0.0	(2)	30.00	37.47
(4)	18.60	12.00	-12.00	(5)	48.00	12.00
						-22.48

REFLECTIVE SURFACE NO. 7 IDENTIFICATION: FORWARD SIDE PANEL LEFT SIDE

CURVE-FIT INPUT DATA

DESIRED TERMS FOR CURVE-FITTING

(1) X TERM	(2) Y TERM	(3) Z TERM	(4) XY TERM	(5) XZ TERM
0.0	0.0	0.0	0.0	0.0

INPUT VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF 0.0 (2) Y COEF 0.0 (3) Z COEF 0.0  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) YSO COEF 0.0 (8) YSO COEF 0.0 (9) ZSO COEF 0.0  
 (10) CONSTANT 0.0



CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* INPUT DATA \*\*\*

REFLECTIVE SURFACE NO. 7 IDENTIFICATION: FORWARD SIDE PANEL LEFT SIDE

BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)

	X	Y	Z	X	Y	Z
(1)	72.00	-48.00	24.00	(2)	96.00	-48.00
(4)	96.00	-31.75	60.00	(5)	84.00	-31.75
				(6)	72.00	42.00
						36.00

REFLECTIVE SURFACE NO. 8 IDENTIFICATION: FORWARD SIDE PANEL RIGHT SIDE

CURVE-FIT INPUT DATA

DESIRIED TERMS FOR CURVE-FITTING

	(1) X TERM	(2) Y TERM	(3) Z TERM	(4) XY TERM	(5) YZ TERM	(6) XZ TERM
(6) YZ TERM	0.0	(7) XSO TERM	0.0	(8) YSO TERM	1.0	(9) ZSO TERM
						0.0

IMPLT VALUES FOR COEFFICIENTS OF SURFACE

	(1) X COEF	(2) Y COEF	(3) Z COEF	(4) XY COEF	(5) YZ COEF	(6) XZ COEF
(4) XY COEF	0.0	(5) YZ COEF	0.0	(6) XZ COEF	0.0	0.0
(7) XSO COEF	0.0	(8) YSO COEF	0.0	(9) ZSO COEF	0.0	0.0
(10) CONSTANT	0.0					

BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)

	X	Y	Z	X	Y	Z
(1)	72.00	48.00	24.00	(2)	96.00	48.00
(4)	96.00	31.75	60.00	(5)	84.00	31.75
				(6)	72.00	42.00
						36.00

REFLECTIVE SURFACE NO. 9 IDENTIFICATION: AFT SIDE PANEL LEFT SIDE

CURVE-FIT INPUT DATA

DESIRIED TERMS FOR CURVE-FITTING

	(1) X TERM	(2) Y TERM	(3) Z TERM	(4) XY TERM	(5) YZ TERM	(6) XZ TERM
(6) YZ TERM	0.0	(7) XSO TERM	0.0	(8) YSO TERM	1.0	(9) ZSO TERM
						0.0

IMPLT VALUES FOR COEFFICIENTS OF SURFACE

	(1) X COEF	(2) Y COEF	(3) Z COEF	(4) XY COEF	(5) YZ COEF	(6) XZ COEF
(4) XY COEF	0.0	(5) YZ COEF	0.0	(6) XZ COEF	0.0	0.0
(7) XSO COEF	0.0	(8) YSO COEF	0.0	(9) ZSO COEF	0.0	0.0
(10) CONSTANT	0.0					

BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)

	X	Y	Z	X	Y	Z
(1)	108.00	-48.00	24.00	(2)	144.00	-48.00
(4)	144.00	-31.75	60.00	(5)	108.00	-31.75
				(6)	108.00	42.00
						42.00

CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* INPUT DATA \*\*\*

REFLECTIVE SURFACE NO. 10 IDENTIFICATION: AFT SIDE PANEL RIGHT SIDE

CURVE-FIT INPUT DATA

DESIRED TERMS FOR CURVE-FITTING

(1) X TERM	(2) Y TERM	(3) Z TERM	(4) XY TERM	(5) XZ TERM	(6) YZ TERM	(7) XSG TERM	(8) YSG TERM	(9) ZSG TERM	(10) CONSTANT
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

INPUT VALUES FOR COEFFICIENTS OF SURFACE

(1) X COEF	(2) Y COEF	(3) Z COEF	(4) XY COEF	(5) XZ COEF	(6) YZ COEF	(7) XSG COEF	(8) YSG COEF	(9) ZSG COEF
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

BOUNDARY POINTS -- BODY AXES (STATIONLINE, OUTLINE, WATERLINE)

	X	Y	Z	
(1)	108.00	49.00	24.00	(2)
(4)	144.00	31.75	60.00	(5)
				(6)
				(7)
				(8)
				(9)
				(10)

CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* RESULTS OF CURVE-FIT ANALYSIS \*\*\*

REFLECTIVE SURFACE DATA

REFLECTIVE SURFACE NO. 1 IDENTIFICATION: WINDSHIELD FORWARD SECTION LEFT SIDE

VALUES FOR COEFFICIENTS OF SURFACE  
 (1) X COEF 0.6320E-01 (2) Y COEF 0.0 (3) Z COEF -0.5745E-02  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSO COEF 0.4787E-03 (8) YSO COEF 0.4787E-03 (9) ZSO COEF 0.4787E-03  
 (10) CONSTANT 0.1000E 01

ROOT MEAN SQUARE ERROR OF FIT= 0.6116E-05

REFLECTIVE SURFACE NO. 2 IDENTIFICATION: WINDSHIELD FORWARD SECTION RIGHT SIDE

VALUES FOR COEFFICIENTS OF SURFACE  
 (1) X COEF 0.6320E-01 (2) Y COEF 0.0 (3) Z COEF -0.5745E-02  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSO COEF 0.4787E-03 (8) YSO COEF 0.4787E-03 (9) ZSO COEF 0.4787E-03  
 (10) CONSTANT 0.1000E 01

ROOT MEAN SQUARE ERROR OF FIT= 0.6116E-05

REFLECTIVE SURFACE NO. 3 IDENTIFICATION: WINDSHIELD AFT SECTION LEFT SIDE

VALUES FOR COEFFICIENTS OF SURFACE  
 (1) X COEF 0.0 (2) Y COEF 0.0 (3) Z COEF -0.5293E-02  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSO COEF 0.0 (8) YSO COEF 0.4409E-03 (9) ZSO COEF 0.4410E-03  
 (10) CONSTANT -0.1000E 01

ROOT MEAN SQUARE ERROR OF FIT= 0.9869E-05

REFLECTIVE SURFACE NO. 4 IDENTIFICATION: WINDSHIELD AFT SECTION RIGHT SIDE B23

VALUES FOR COEFFICIENTS OF SURFACE  
 (1) X COEF 0.0 (2) Y COEF 0.0 (3) Z COEF -0.5293E-02  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSO COEF 0.0 (8) YSO COEF 0.4409E-03 (9) ZSO COEF 0.4410E-03  
 (10) CONSTANT -0.1000E 01

ROOT MEAN SQUARE ERROR OF FIT= 0.9869E-05

CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* RESULTS OF CURVE-FIT ANALYSIS \*\*\*

REFLECTIVE SURFACE DATA

REFLECTIVE SURFACE NO. 5 IDENTIFICATION: LOWER FRONT PANEL LEFT SIDE

VALUES FOR COEFFICIENTS OF SURFACE  
 (1) X COEF 0.6319E-01 (2) Y COEF 0.0 (3) Z COEF -0.5735E-02  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSG COEF 0.4787E-03 (8) YSG COEF 0.4786E-03 (9) ZSG COEF 0.4786E-03  
 (10) CONSTANT 0.1000E 01

ROOT MEAN SQUARE ERROR OF FIT= 0.2958E-04

REFLECTIVE SURFACE NO. 6 IDENTIFICATION: LOWER FRONT PANEL RIGHT SIDE

VALUES FOR COEFFICIENTS OF SURFACE  
 (1) X COEF 0.6319E-01 (2) Y COEF 0.0 (3) Z COEF -0.5735E-02  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSG COEF 0.4787E-03 (8) YSG COEF 0.4786E-03 (9) ZSG COEF 0.4786E-03  
 (10) CONSTANT 0.1000E 01

ROOT MEAN SQUARE ERROR OF FIT= 0.2958E-04

REFLECTIVE SURFACE NO. 7 IDENTIFICATION: FORWARD SIDE PANEL LEFT SIDE

VALUES FOR COEFFICIENTS OF SURFACE  
 (1) X COEF 0.0 (2) Y COEF 0.0 (3) Z COEF -0.5312E-02  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSG COEF 0.0 (8) YSG COEF 0.4410E-03 (9) ZSG COEF 0.4414E-03  
 (10) CONSTANT -0.1000E 01

ROOT MEAN SQUARE ERROR OF FIT= 0.2322E-04

REFLECTIVE SURFACE NO. 8 IDENTIFICATION: FORWARD SIDE PANEL RIGHT SIDE B24

VALUES FOR COEFFICIENTS OF SURFACE  
 (1) X COEF 0.0 (2) Y COEF 0.0 (3) Z COEF -0.5312E-02  
 (4) XY COEF 0.0 (5) XZ COEF 0.0 (6) YZ COEF 0.0  
 (7) XSG COEF 0.0 (8) YSG COEF 0.4410E-03 (9) ZSG COEF 0.4414E-03  
 (10) CONSTANT -0.1000E 01

ROOT MEAN SQUARE ERROR OF FIT= 0.2322E-04



CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* RESULTS OF CURVE-FIT ANALYSIS \*\*\*

REFLECTIVE SURFACE DATA

REFLECTIVE SURFACE NO. 9 IDENTIFICATION: AFT SIDE PANEL LEFT SIDE

VALUES FOR COEFFICIENTS OF SURFACE									
(1) X	COEF	0.0	(2) Y	COEF	0.0	(3) Z	COEF	-0.5307E-02	
(4) XY	COEF	0.0	(5) XZ	COEF	0.0	(6) YZ	COEF	0.0	
(7) XSO	COEF	0.0	(8) YSO	COEF	0.4410E-03	(9) ZSO	COEF	0.4413E-03	
(10) CONSTANT	-0.1000E 01								

ROOT MEAN SQUARE ERROR OF FIT= 0.4186E-15

REFLECTIVE SURFACE NO. 10 IDENTIFICATION: AFT SIDE PANEL RIGHT SIDE

VALUES FOR COEFFICIENTS OF SURFACE									
(1) X	COEF	0.0	(2) Y	COEF	0.0	(3) Z	COEF	-0.5307E-02	
(4) XY	COEF	0.0	(5) XZ	COEF	0.0	(6) YZ	COEF	0.0	
(7) XSO	COEF	0.0	(8) YSO	COEF	0.4410E-03	(9) ZSO	COEF	0.4413E-03	
(10) CONSTANT	-0.1000E 01								

ROOT MEAN SQUARE ERROR OF FIT= 0.4186E-15

CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 1 IDENTIFICATION: WINDSHIELD FORWARD SECTION LEFT SIDE

SUN ELEVATION 0.0  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

A/C YAW

BOUNDARY POINTS -- BODY AXES  
(STATIONLINE, OUTLINE, WATERLINE)  
X Y Z

STATUS FLAGS FOR POINTS  
INRFL ISHAD INTRF

GLINT  
AZIMUTH ELEVATION

XPRY 114.00  
YROT C.C  
ZROT 1P.00  
DISTG 1500.00

-45.00	48.00	-48.00	24.00	1	0	0	89.85	0.02
-45.00	16.25	-36.00	24.00	1	0	0	173.10	0.02
-45.00	6.43	-24.00	24.00	0	0	0	-149.65	0.02
-45.00	0.0	0.0	24.00	0	0	0	-95.74	0.02
-45.00	6.43	0.0	48.00	0	0	0	-104.13	27.75
-45.00	16.25	0.0	60.00	0	0	0	-141.81	44.64
-45.00	48.00	0.0	72.00	0	0	0	-179.85	0.17
-45.00	48.00	-37.47	54.00	1	0	0	122.73	-43.69
45.00	48.00	-48.00	24.00	0	0	0	-99.75	0.02
45.00	16.25	-76.00	24.00	0	0	0	-7.00	0.02
45.00	6.43	-24.00	24.00	0	0	0	30.82	0.02
45.00	0.0	0.0	24.00	0	0	0	89.74	0.02
45.00	6.43	0.0	48.00	0	0	0	104.13	27.75
45.00	16.25	0.0	60.00	0	0	0	141.81	44.64
45.00	48.00	0.0	72.00	0	0	0	179.85	0.17
45.00	48.00	-37.47	54.00	0	0	0	-122.51	43.77

## REFLECTIVE SURFACE NO. 2 IDENTIFICATION: WINDSHIELD FORWARD SECTION RIGHT SIDE

REFLECTIVE SURFACE NO. 2	0.0
SUN ELEVATION	0.0
A/C PITCH ATTITUDE	0.0
A/C ROLL ATTITUDE	0.0

NR0T	114.00
YR0T	0.0
ZR0T	12.00
DISTG	1500.00

GLINT ELEVATION

STATUS FLAGS FOR POINTS	
INRFL	ISHAD INTF
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
18	18
19	19
20	20
21	21
22	22
23	23
24	24
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34	34
35	35
36	36
37	37
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42	42
43	43
44	44
45	45
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76	76
77	77
78	78
79	79
80	80
81	81
82	82
83	83
84	84
85	85
86	86
87	87
88	88
89	89
90	90
91	91
92	92
93	93
94	94
95	95
96	96
97	97
98	98
99	99
100	100

BOUNDARY POINTS -- BODY AXES  
(STATIONLINE,BUTTLINE,WATERLINE)

A/C YAW

-45.00

-45.00

-45.00

-45.00

-45.60

-45.00

-45.00

-45.00

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7.00 0.02

-30.02 0.02

-89.74      0.02

-108.13 27.75

-141.81 44.64

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-122-71 -03-69

CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 3 IDENTIFICATION: WINDSHIELD AFT SECTION LEFT SIDE

SUN ELEVATION 0.0  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

XROT 114.00  
YROT 0.0  
ZROT 18.00  
DISTG 1500.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, OUTLINE, WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INRFL	ISMAD	INTRF	AZIMUTH	ELEVATION
-45.00	72.00	0.0	72.00	0	0	0	-179.91	0.17
-45.00	66.00	-31.75	60.00	1	0	0	142.24	-44.55
-45.00	60.00	-41.57	48.00	1	0	0	108.48	-37.80
-45.00	48.00	-48.00	24.00	1	0	0	89.96	0.02
-45.00	48.00	-37.47	54.00	1	0	0	122.73	-43.68
-45.00	48.00	0.0	72.00	0	0	0	-179.85	0.17
45.00	72.00	0.0	72.00	0	0	0	179.91	0.17
45.00	66.00	-31.75	60.00	0	0	0	-142.54	44.70
45.00	60.00	-41.57	48.00	0	0	0	-108.24	37.87
45.00	48.00	-48.00	24.00	0	0	0	-89.74	0.02
45.00	48.00	-37.47	54.00	0	0	0	-122.50	43.74
45.00	48.00	0.0	72.00	0	0	0	179.85	0.17



CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* SUN GLINT SIGNATURE \*\*\*

IDENTIFICATION: WINDSHIELD AFT SECTION RIGHT SIDE

REFLECTIVE SURFACE NO. 4

SUN ELEVATION 0.0  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

XROT 114.00  
YROT 0.0  
ZROT 18.00  
DISTG 1500.00

GLINT  
AZIMUTH ELEVATION

STATUS FLAG FOR POINTS  
INREL ISHAD INTRF

BOUNDARY POINTS -- BODY AXES  
(STATIONLINE, RUTLINE, WATERLINE)  
X Y Z

-45.00	72.00	0.0	72.00	0	0	0	-179.91	0.17
-45.00	66.00	31.75	60.00	0	0	0	142.04	44.70
-45.00	60.00	41.57	48.00	0	0	0	108.24	37.87
-45.00	48.00	48.00	24.00	0	0	0	89.74	0.02
-45.00	48.00	37.47	54.00	0	0	0	122.50	43.78
-45.00	48.00	0.0	72.00	0	0	0	-179.85	0.17
45.00	72.00	0.0	72.00	0	0	0	179.91	0.17
45.00	66.00	31.75	60.00	1	0	0	-142.24	-44.55
45.00	60.00	41.57	48.00	1	0	0	-108.48	-37.60
45.00	48.00	48.00	24.00	1	0	0	-89.96	0.02
45.00	48.00	37.47	54.00	1	0	0	-122.73	-43.68
45.00	48.00	0.0	72.00	0	0	0	179.85	0.17

CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* SUM GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 5 IDENTIFICATION: LOWER FRONT PANEL LEFT SIDE

SUN ELEVATION 0.0  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

XROT 114.00  
YROT 0.0  
ZROT 18.00  
DISTG 1500.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INREL	ISHAD	INTRF	AZIMUTH	ELEVATION
-45.00	48.00	-41.57	0.0	1	0	0	108.44	37.84
-45.00	30.00	-37.47	0.0	1	0	0	150.88	16.64
-45.00	8.20	-12.00	0.0	0	0	0	-136.41	-24.21
-45.00	18.60	-12.00	-12.00	0	0	0	-159.91	-22.72
-45.00	48.00	-12.00	-22.44	1	0	0	176.35	19.96
-45.00	48.00	-37.47	-6.00	1	0	0	122.71	43.70
45.00	48.00	-41.57	0.0	0	0	0	-108.22	-37.85
45.00	30.00	-37.47	0.0	0	0	0	-54.12	-54.77
45.00	8.20	-12.00	0.0	0	0	0	75.03	-49.61
45.00	18.60	-12.00	-12.00	0	0	0	129.00	-66.18
45.00	48.00	-12.00	-22.44	0	0	0	-176.29	-20.19
45.00	48.00	-37.47	-6.00	0	0	0	-122.49	-43.75

## CURVED PANELS WITH NO FENCES

SAMPLE CASE TWO

\*\*\* SUM GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 6 IDENTIFICATION: LOWER FRONT PANEL RIGHT SIDE

SUN ELEVATION 0.0  
 A/C PITCH ATTITUDE 0.0  
 A/C ROLL ATTITUDE 0.0

KROT 114.00  
 YROT 5.0  
 ZROT 18.00  
 DISTG 1500.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INRFL	ISHAD	INTRE	AZIMUTH	ELEVATION
-45.00	48.00	41.57	0.0	0	0	0	108.22	-37.85
-45.00	30.00	37.47	0.0	0	0	0	54.12	-54.77
-45.00	8.20	12.00	0.0	0	0	0	-75.03	-49.61
-45.00	18.60	12.00	-12.00	0	0	0	-129.00	-66.18
-45.00	48.90	12.00	-22.48	0	0	0	176.29	-20.19
-45.00	48.00	37.47	-6.00	0	0	0	122.49	-43.75
45.00	48.00	41.57	0.0	1	0	0	-108.44	37.84
45.00	30.00	37.47	0.0	1	0	0	-150.88	16.68
45.00	8.20	12.00	0.0	0	0	0	136.41	-24.21
45.00	18.60	12.00	-12.00	0	0	0	159.91	-22.72
45.00	48.00	12.00	-22.48	1	0	0	-176.35	19.96
45.00	48.00	37.47	-6.00	1	0	0	-122.71	43.70

CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 7 IDENTIFICATION: FORWARD SIDE PANEL LEFT SIDE

SUN ELEVATION 0.0  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

XROT 114.00  
YROT 0.0  
ZROT 16.00  
DISTG 1500.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLINE, WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INREL	ISHAD	INTRE	AZIMUTH	ELEVATION
-45.00	72.00	-46.00	24.00	1	0	0	90.01	0.05
-45.00	96.00	-46.00	24.00	1	0	0	90.07	0.05
-45.00	96.00	-44.50	42.00	1	0	0	59.37	-29.44
-45.00	96.00	-31.75	60.00	1	0	0	142.26	-44.50
-45.00	84.00	-31.75	60.00	1	0	0	142.26	-44.52
-45.00	72.00	-46.44	36.00	1	0	0	53.83	-20.02
45.00	72.00	-46.00	24.00	0	0	0	-89.80	-0.01
45.00	96.00	-46.00	24.00	0	0	0	-89.85	-0.01
45.00	96.00	-44.50	42.00	0	0	0	-59.14	29.49
45.00	96.00	-31.75	60.00	0	0	0	-142.05	44.65
45.00	84.00	-31.75	60.00	0	0	0	-142.06	44.67
45.00	72.00	-46.44	36.00	0	0	0	-93.61	20.06



CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 4 IDENTIFICATION: FORWARD SIDE PANEL RIGHT SIDE

SUN ELEVATION 0.0  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

XROT 114.00  
YROT 0.0  
ZROT 18.00  
DISTG 1500.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, OUTLINE, WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	INRFL	ISMAD	INTPE	AZIMUTH	ELEVATION
-45.00	72.00	48.00	24.00	0	0	0	89.80	-0.01
-45.00	96.00	48.00	24.00	0	0	0	89.85	-0.01
-45.00	96.00	44.50	42.00	0	0	0	99.14	29.49
-45.00	96.00	31.75	60.00	0	0	0	142.05	44.65
-45.00	84.00	31.75	60.00	0	0	0	142.06	44.67
-45.00	72.00	46.48	36.00	0	0	0	93.61	20.36
45.00	72.00	48.00	24.00	1	0	0	-90.01	0.05
45.00	96.00	48.00	24.00	1	0	0	-90.07	0.05
45.00	96.00	44.50	42.00	1	0	0	-59.37	-29.44
45.00	96.00	31.75	60.00	1	0	0	-142.26	-44.50
45.00	84.00	31.75	60.00	1	0	0	-142.26	-44.52
45.00	72.00	46.48	36.00	1	0	0	-97.83	-20.32

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CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 9 IDENTIFICATION: AFT. SIDE PANEL LEFT SIDE

SUN ELEVATION 0.0  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

YROT 114.00  
XROT 0.0  
ZROT 18.00  
DISTG 1500.00

A/C YAW	BOUNDARY POINTS -- BODY AXES (STATIONLINE, BUTTLIN, WATERLINE)			STATUS FLAGS FOR POINTS			GLINT	
	X	Y	Z	TYPE	ISHAD	INTREF	AZIMUTH	ELEVATION
-45.00	108.00	-48.00	24.00	1	0	0	90.09	0.04
-45.00	144.00	-48.00	24.00	1	0	0	90.18	0.04
-45.00	144.00	-44.50	42.00	1	0	0	99.46	-29.39
-45.00	144.00	-31.75	60.00	1	0	0	142.23	-44.43
-45.00	108.00	-31.75	60.00	1	0	0	142.24	-44.49
-45.00	108.00	-44.50	42.00	1	0	0	99.40	-29.43
45.00	108.00	-48.00	24.00	0	0	0	-89.88	-0.00
45.00	144.00	-48.00	24.00	0	0	0	-89.96	-0.00
45.00	144.00	-44.50	42.00	0	0	0	-99.23	29.43
45.00	144.00	-31.75	60.00	0	0	0	-142.03	44.58
45.00	108.00	-31.75	60.00	0	0	0	-142.04	44.63
45.00	108.00	-44.50	42.00	0	0	0	-99.17	29.47

CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

\*\*\* SUN GLINT SIGNATURE \*\*\*

REFLECTIVE SURFACE NO. 10

IDENTIFICATION: AFT SIDE PANEL RIGHT SIDE

SUN ELEVATION 0.0  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

XROT 114.00  
YROT 0.0  
ZROT 18.00  
DISTG 1500.00

A/C YAW

BOUNDARY POINTS -- BODY AXES  
(STATIONLINE, OUTLINE, WATERLINE)  
X Y Z

STATUS FLAGS FOR POINTS  
INPFL ISHAD INTRF

GLINT  
AZIMUTH ELEVATION

-45.00	108.00	48.00	24.00	0	0	0	89.88	-0.00
-45.00	144.00	48.00	24.00	0	0	0	89.96	-0.00
-45.00	144.00	44.50	42.00	0	0	0	59.23	29.43
-45.00	144.00	31.75	60.00	0	0	0	142.03	44.58
-45.00	108.00	31.75	60.00	0	0	0	142.04	44.63
-45.00	108.00	44.50	42.00	0	0	0	94.17	29.47
45.00	108.00	48.00	24.00	1	0	0	-90.09	0.04
45.00	144.00	48.00	24.00	1	0	0	-90.16	0.04
45.00	144.00	44.50	42.00	1	0	0	-99.46	-29.39
45.00	144.00	31.75	60.00	1	0	0	-142.23	-44.43
45.00	108.00	31.75	60.00	1	0	0	-142.24	-44.49
45.00	108.00	44.50	42.00	1	0	0	-99.40	-29.43

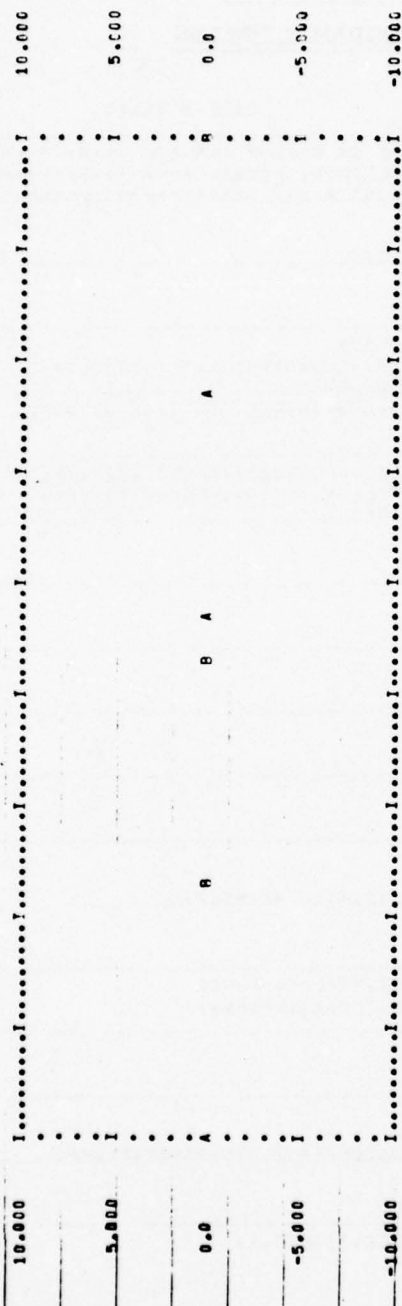
CURVED PANELS WITH NO FENCES SAMPLE CASE TWO

SUN GLINT SIGNATURE

SUN ELEVATION 0.0  
A/C PITCH ATTITUDE 0.0  
A/C ROLL ATTITUDE 0.0

OBSERVER ANGLE  
DEGREES

OBSERVER ANGLE  
DEGREES



GLINT AZIMUTH WITH RESPECT TO SUN - DEGREES

PROBABILITY: 0.497

KEY TO PLOT SYMBOLS

SYMBOL	A/C HEADING (DEG)	SYMBOL	A/C HEADING (DEG)
A	-45.00	F	
B	45.00	G	
C		H	
D		I	
E		J	



APPENDIX B  
PROGRAM LISTING

6 LEVEL 21	MAIN	DATE = 78103	08/54/44
C*****	PROGRAMMED BY FRED WHITE ON BOEING IBM 370 *****		00000041
C*****	BOEING VERTOL, PHILADELPHIA, PENNA. *****		00000042
C*****	AREA CODE 215 522-2256 *****		00000043
C			00000044
C			00000045
	REAL*8 XCURE(450),FCURE(50),SIG		00000050
	REAL*8 CFALP(9)		00000060
	DIMENSION ALP(50),BALP(50)		00000070
	DIMENSION SIGF(20),SIGS(12)		00000080
	DIMENSION COEFFB(80),COEFFS(120)		00000090
	DIMENSION DATAC(30),DATAF(200),DATAS(1500),TITLES(960),		00000100
1	MF(20),MS(12),CWORKS(120),CWORKS2(120)		00000110
	DIMENSION ALPHA2(800),BETA2(800),INTRFL(800),ISHADW(800),		00000120
1	INTERF(800)		00000130
	DIMENSION IPLTOL(432)		00000140
	DIMENSION IBUF(1000),XPLOT(63),YPLOT(63),APLOT(432),BPLOT(432)		00000150
	COMMON/TOLRS/TOLEGN,TOLSNT,TOLQPT,TOLINT,TOLCK1,TOLCK2,		00000160
1	TOLCK4,DELT,TOLCIR,ANGST2,TOLPLT		00000170
	TOLEGN=0.000001		00000171
	TOLSNT=0.0001		00000172
	TOLQPT=0.00000001		00000173
	TCLINT=0.02		00000174
	TOLCK1=0.02		00000175
	TOLCK2=0.02		00000176
	TOLCK4=0.02		00000177
	DELT=0.10		00000178
	TOLCIR=0.0001		00000179
	ANGST2=90.		00000180
	TOLPLT=0.0001		00000181
	DO 5 I=1,30		00000182
5	DATAC(I)=0.0		00000190
	DO 6 I=1,200		00000200
6	DATAF(I)=0.		00000210
	DO 7 I=1,1500		00000220
7	DATAS(I)=0.		00000230
	CALL INPUT(DATAC,DATAF,DATAS,TITLES,MF,MS,0)		00000240
	KPRINT=DATAC(2)+0.5		00000250
	IPLOT=DATAC(24)+0.5		00000260
	IPROBL=DATAC(25)+0.5		00000270
	CALL OUTPT1(DATAC,DATAF,DATAS,TITLES,MF,MS)		00000280
	CALL INPUT(DATAC,DATAF,DATAS,TITLES,MF,MS,1)		00000290
	NFENCE=DATAC(22)+0.5		00000300
	IF(NFENCE.EQ.0) GO TO 14		00000310
	DO 12 I=1,NFENCE		00000320
	L=MF(I)		00000330
	NPTS=DATAF(L)+0.5		00000340
	ISTART=L+1		00000350
	CALL CFITF(DATAF,ISTART,NPTS,COEFFB,I,SIG,XCURE,FCURE)		00000360
	SIGF(I)=SIG		00000370
12	CONTINUE		00000380
	IF(KPRINT.LT.2) GO TO 14		00000390
	CALL OUTPT2(COEFFB,SIGF,NFENCE,TITLES,1)		00000400

14	CONTINUE	00000410
	NPANEL=DATAC(23)+0.5	00000420
	DO 15 I=1,NPANEL	00000430
	L=MS(I)	00000440
	NPTS=DATAS(L)+0.5	00000450
	ISTART=L+1	00000460
	CALL CFITS(DATAC,DATAS,ISTART,NPTS,COEFSB,1,SIG,XCURF,FCURF)	00000470
	SIGS(I)=SIG	00000480
15	CONTINUE	00000490
	IF(KPRINT.LT.2) GO TO 16	00000500
	CALL OUTPT2(COEFSB,SIGS,NPANEL,TITLES,2)	00000510
16	CONTINUE	00000520
	NGAM=DATAC(6)+0.5	00000530
	DGAM=DATAC(8)	00000540
	GAMMA=DATAC(7)-DGAM	00000550
	IF(IPLLOT.EQ.0.OR.IPLLOT.EQ.2) GO TO 17	00000560
	JCONT=0	00000570
	CALL PLOTS(IHUF,1000,9)	00000580
17	CONTINUE	00000590
	DO 30 I=1,NGAM	00000600
	GAMMA=GAMMA+DGAM	00000610
	CALL GLINT(DATAC,DATAS,MS,COEFSB,GAMMA,ALPHA2,BETA2,INTRFL,	00000620
	1 ISHADW,INTERF,DWORKS,DATAF,MF)	00000630
	IF(KPRINT.LT.1) GO TO 18	00000640
	CALL OUTPT3(DATAC,DATAS,MS,TITLES,GAMMA,ALPHA2,BETA2,INTRFL,	00000650
	1 ISHADW,INTERF)	00000660
18	CONTINUE	00000670
	CALL MINMAX(DATAC,DATAS,MS,ALPHA2,BETA2,APLOT,BPLOT,INTRFL,	00000680
	1 ISHADW,INTERF,IPLTOL)	00000690
	IF(IPROBL.EQ.0) GO TO 19	00000700
	CALL PROPL(DATAC,DATAS,MS,APLOT,BPLOT,XPLOT,YPLOT,DWORKS,DWKSP2,	00000710
	1 VPROBL,IPLTOL)	00000720
19	CONTINUE	00000730
	IF(IPLLOT.EQ.0.OR.IPLLOT.EQ.1) GO TO 20	00000740
	CALL PLOTOL(DATAC,DATAS,MS,TITLES,GAMMA,APLOT,BPLOT,	00000750
	1 VPROBL,IPLTOL)	00000760
20	CONTINUE	00000770
	IF(IPLLOT.EQ.0.OR.IPLLOT.EQ.2) GO TO 21	00000780
	CALL DRPLOT(DATAC,DATAS,MS,GAMMA,ALPHA2,BETA2,INTRFL,	00000790
	1 ISHADW,INTERF,XPLOT,YPLOT,IHUF,JCONT,DWORKS,DWKSP2,VPROBL)	00000800
21	CONTINUE	00000810
30	CONTINUE	00000820
	IF(IPLLOT.EQ.0.OR.IPLLOT.EQ.2) GO TO 31	00000830
	CALL PLOT(10.0,0.999)	00000840
31	CONTINUE	00000850
	STOP	00000860
	END	00000870

G LEVEL	21	INPUT	DATE = 78102	10/47/48
		SUBROUTINE INPUT(DATAC,DATAF,DATAS,TITLES,MF,MS,IDTRAN)		00000880
		DIMENSION DATAC(1),DATAF(1),DATAS(1),TITLES(1),MF(1),MS(1)		00000890
		DATA BLANK/1H /		00000900
		IF(IDTRAN.EQ.1) GO TO 80		00000930
		READ(5,101) (TITLES(I),I=1,72)		00000940
		DO 2 I=73,80		00000950
2		TITLES(I)=BLANK		00000960
		LT=80		00000970
		READ(5,100) DEFLT,PRINT,THETA,PHI,		00001000
		IF(DEFLT.LT.0.5) DEFLT=0.		00001010
		IF(PRINT.LT.0.5) PRINT=0.		00001020
		IF(ABS(THETA).LT.0.001) THETA=0.		00001030
		IF(ABS(PHI).LT.0.001) PHI=0.		00001040
		DATAC(1)=DEFLT		00001050
		DATAC(2)=PRINT		00001060
		DATAC(3)=0.		00001070
		DATAC(4)=THETA		00001080
		DATAC(5)=PHI		00001090
		READ(5,100) GAMN,GAMI,DGAM,PSIN,PSII,DPSI		00001100
		IF(GAMN.GT.0.5) GO TO 3		00001110
		GAMN=3.		00001120
		GAMI=0.		00001130
		DGAM=30.		00001140
3		IF(PSIN.GT.0.5) GO TO 5		00001150
		PSIN=9.		00001160
		PSII=-180.		00001170
		DPSI=45.		00001180
5		DATAC(6)=GAMN		00001190
		DATAC(7)=GAMI		00001200
		DATAC(8)=DGAM		00001210
		DATAC(9)=PSIN		00001220
		DATAC(10)=PSII		00001230
		DATAC(11)=DPSI		00001240
		READ(5,100) XROT,YROT,ZROT		00001250
		IF(ABS(XROT).LT.0.001) XROT=0.		00001260
		IF(ABS(YROT).LT.0.001) YROT=0.		00001270
		IF(ABS(ZROT).LT.0.001) ZROT=0.		00001280
		DATAC(12)=XROT		00001290
		DATAC(13)=YROT		00001300
		DATAC(14)=ZROT		00001310
		READ(5,100) DISTG,ELVMIN,ELVMAX,AZMMIN,AZMMAX		00001320
		IF(ABS(DISTG).LT.0.001) DISTG=1000.		00001330
		IF(ABS(ELVMIN).GT.0.001) GO TO 6		00001340
		IF(ABS(ELVMAX).GT.0.001) GO TO 6		00001350
		ELVMIN=-10.		00001360
		ELVMAX=10.		00001370
6		IF(ABS(AZMMIN).GT.0.001) GO TO 7		00001380
		IF(ABS(AZMMAX).GT.0.001) GO TO 7		00001390
		AZMMIN=-180.		00001400
		AZMMAX=180.		00001410
7		DATAC(15)=DISTG		00001420
		DATAC(16)=ELVMIN		00001430

G LEVEL	21	INPUT	DATE = 78102	10/47/48
		DATA(17)=ELVMAX		00001440
		DATA(18)=AZHMIN		00001450
		DATA(19)=AZHMAX		00001460
		READ(5,100) FENCES,PANELS,PLOT,PROBL		00001470
		DATA(22)=FENCES		00001480
		DATA(23)=PANELS		00001490
		DATA(24)=PLOT		00001500
		DATA(25)=PROBL		00001510
		LOC=1		00001520
		IF(DATA(22).LT.0.5) GO TO 30		00001530
		NFENCE=DATA(22)+0.5		00001540
		DO 20 I=1,NFENCE		00001550
		READ(5,100) DATAF(LOC)		00001560
		NPTS=DATAF(LOC)+0.5		00001570
		MF(I)=LOC		00001580
		N3=3*NPTS		00001590
		READ(5,100) (DATAF(LOC+J),J=1,N3)		00001600
20		LOC=LOC+N3+1		00001610
30		NPANEL=DATA(23)+0.5		00001620
		LOC=1		00001630
		DO 40 I=1,NPANEL		00001640
		MS(I)=LOC+20		00001650
		READ(5,101) (TITLES(LT+J),J=1,72)		00001660
		DO 301 J=73,80		00001670
301		TITLES(LT+J)=BLANK		00001680
		LT=LT+80		00001690
		READ(5,100) DATAS(LOC)		00001700
		IF(DATAS(LOC).GT.0.5) GO TO 32		00001710
		IF(DATA(1).GT.0.5) GO TO 310		00001720
		READ(5,100) (DATAS(LOC+J),J=1,9)		00001730
		READ(5,100) (DATAS(LOC+J),J=10,19)		00001740
310		READ(5,100) DATAS(LOC+20)		00001790
		NPTS=DATAS(LOC+20)+0.5		00001800
		N3P20=20+3*NPTS		00001810
		READ(5,100) (DATAS(LOC+J),J=21,N3P20)		00001820
		GO TO 38		00001830
32		IF(I.EQ.1) GO TO 70		00001840
		ISYM=DATAS(LOC)+0.5		00001850
		DO 34 J=1,20		00001860
34		DATAS(LOC+J)=DATAS(LOCP+J)		00001870
		NPTS=DATAS(LOC+20)+0.5		00001880
		DO 35 J=1,NPTS		00001890
		L=(J-1)*3		00001900
		DATAS(LOC+21+L)=DATAS(LOCP+21+L)		00001910
		DATAS(LOC+22+L)=DATAS(LOCP+22+L)		00001920
		DATAS(LOC+23+L)=DATAS(LOCP+23+L)		00001930
		IF(ISYM.EQ.1) DATAS(LOC+22+L)=-DATAS(LOC+22+L)		00001940
		IF(ISYM.EQ.2) DATAS(LOC+23+L)=-DATAS(LOC+23+L)		00001950
		IF(ISYM.EQ.3) DATAS(LOC+21+L)=-DATAS(LOC+21+L)		00001960
35		CONTINUE		00001970
38		LOCP=LOC		00001980
40		LOC=LOC+21+3*NPTS		00001990



G LEVEL	21	INPUT	DATE = 78102	10/47/48
		NT=NPANEL+1		00002000
		DO 68 I=1,NT		00002010
		L=(I-1)*80		00002020
		NB=0		00002030
		DO 62 J=1,80		00002040
		IF(TITLES(L+J).NE.BLANK) GO TO 63		00002050
62		NB=NB+1		00002060
63		IF(NB.EQ.80) GO TO 68		00002070
		IF(NB.EQ.0) GO TO 68		00002080
		DO 66 J=1,80		00002090
		K=J+NB		00002100
		IF(K.GT.80) GO TO 64		00002110
		TITLES(L+J)=TITLES(L+K)		00002120
		GO TO 66		00002130
64		TITLES(L+J)=BLANK		00002140
66		CONTINUE		00002150
68		CONTINUE		00002160
		RETURN		00002170
70		WRITE(6,500)		00002180
		STOP		00002190
500		FORMAT(1H1,*ERROR IN INPUT, SYMMETRICAL PANEL CANNOT BE FIRST*)		00002200
100		FORMAT(6E10.0)		00002210
101		FORMAT(80A1)		00002220
80		CONTINUE		00002230
		IF(DATAC(22).LT.0.5) GO TO 90		00002240
		NFENCE=DATAC(22)+0.5		00002250
		DO 88 I=1,NFENCE		00002260
		LOC=MF(I)		00002270
		NPTS=DATAF(LOC)+0.5		00002280
		DO 86 J=1,NPTS		00002290
		DO 86 JJ=1,3		00002300
		LJ=(J-1)*3+JJ		00002310
86		DATAF(LOC+LJ)=DATAF(LOC+LJ)-DATAC(JJ+11)		00002320
88		CONTINUE		00002330
90		CONTINUE		00002340
		NPANEL=DATAC(23)+0.5		00002350
		DO 96 I=1,NPANEL		00002360
		LOCP20=MS(I)		00002370
		NPTS=DATAS(LOCP20)+0.5		00002380
		DO 94 J=1,NPTS		00002390
		DO 94 JJ=1,3		00002400
		LJ=(J-1)*3+JJ		00002410
94		DATAS(LOCP20+LJ)=DATAS(LOCP20+LJ)-DATAC(JJ+11)		00002420
96		CONTINUE		00002430
		RETURN		00002440
		END		00002440

G LEVEL	21	OUTPT1	DATE = 78102	10/47/48
		SUBROUTINE OUTPT1(DATA,DATAF,DATAS,TITLES,MF,MS)		00002450
		DIMENSION DATA(1),DATAF(1),DATAS(1),TITLES(1),MF(1),MS(1)		00002460
		WRITE(6,102) (TITLES(I),I=1,80)		00002470
102		FORMAT(1H1,80A1)		00002480
		WRITE(6,101)		00002490
101		FORMAT(1H0,51X,**** INPUT DATA ****)		00002500
		WRITE(6,103) DATA(1),DATA(2),DATA(24),DATA(25)		00002510
103		FORMAT(1H0,2X,***CONTROL OPTIONS*/1H ,5X,*DEFAULT OPTION*,7X,F2.0,		00002520
	1	8X,*PRINT OPTION*,9X,F2.0/		00002530
	2	1H ,5X,*PLOT OPTION*,10X,F2.0,8X,*PROBABILITY OPT*,6X,		00002540
	3	F2.0)		00002550
		WRITE(6,104) DATA(4),DATA(5),DATA(10)		00002560
104		FORMAT(1H0,2X,***AIRCRAFT INITIAL EULER ORIENTATION*/1H ,5X,*PITCH		00002570
	1	*13X,F6.1,7X,*ROLL*,14X,F6.1,7X,*YAW*,15X,F6.1)		00002580
		WRITE(6,105) (DATA(I),I=9,11)		00002590
105		FORMAT(1H0,2X,***SELECTED YAW ANGLE ROTATIONS*/1H ,5X,*NO. OF ANGLE		00002600
	2	ES*,6X,F4.0,8X,*INITIAL ANGLE*,5X,F6.1,7X,*ANGLE INCREMENT*,3X,F6.		00002610
	3	1)		00002620
		WRITE(6,106) (DATA(I),I=6,8)		00002630
106		FORMAT(1H0,2X,***SELECTED SUN ELEVATIONS*/1H ,5X,*NO. OF ANGLES*,		00002640
	1	6X,F4.0,8X,*INITIAL ANGLE*,5X,F6.1,7X,*ANGLE INCREMENT*,3X,F6.1)		00002650
		WRITE(6,107) DATA(15),DATA(12),DATA(13),DATA(14)		00002660
107		FORMAT(1H0,2X,***REFERENCE INFORMATION FOR MEASURING SUN GLINT ANGLE		00002670
	1	LES*/1H ,5X,*REFERENCE POINT FOR MEASURING ANGLES OF GLINT SIGNATU		00002680
	2	RE*,5X,*DISTANCE AT WHICH GLINT SIGNATURE FORMED (FT.)*,F10.3/1H ,		00002690
	3	18X,*X*,9X,*Y*,9X,*Z*/1H ,14X,3(F7.2,3X))		00002700
		WRITE(6,108) DATA(18),DATA(16),DATA(19),DATA(17)		00002710
108		FORMAT(1H0,2X,***PLOT SCALING*/1H ,5X,*GLINT AZIMUTH*,18X,*GLINT E		00002720
	1	LEVATION*/1H ,7X,*MINIMUM*,8X,F6.1,10X,*MINIMUM*,8X,F6.1/1H ,7X,		00002730
	2	*MAXIMUM*,8X,F6.1,10X,*MAXIMUM*,8X,F6.1)		00002740
		WRITE(6,109) DATA(18),DATA(16),DATA(19),DATA(17)		00002750
109		FORMAT(1H0,2X,***BOUNDARIES FOR CALCULATING PROBABILITY*/1H ,5X,		00002760
	1	*GLINT AZIMUTH*,18X,*GLINT ELEVATION*/1H ,7X,*MINIMUM*,8X,F6.1,		00002770
	2	10X,*MINIMUM*,8X,F6.1/1H ,7X,*MAXIMUM*,8X,F6.1,10X,*MAXIMUM*,8X,		00002780
	3	F6.1)		00002790
		IF(DATA(22).LT.0.5) GO TO 25		00002800
		WRITE(6,102) (TITLES(MMM),MMM=1,80)		00002810
		WRITE(6,101)		00002820
		WRITE(6,110) DATA(22)		00002830
110		FORMAT(1H0,2X,***FENCE DATA*/1H ,5X,*NO. OF FENCES*,7X,F3.0)		00002840
		LINES=5		00002850
		NFENCE=DATA(22)+0.5		00002860
		DO 20 I=1,NFENCE		00002870
		M2=MF(I)		00002880
		WRITE(6,111)		00002890
		LINES=LINES+2		00002900
		IF((LINES+6).LE.50) GO TO 4		00002910
		WRITE(6,102) (TITLES(MMM),MMM=1,80)		00002920
		WRITE(6,101)		00002930
		WRITE(6,111)		00002940
		LINES=5		00002950
	4	WRITE(6,112) I,DATAF(M2)		00002960

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111 FORMAT(1H0) 00002970
112 FORMAT(1H ,5X ,*FENCE NO.* ,I3/1H ,7X ,*NUMBER OF POINTS* ,4X ,F3.0/ 00002980
1 1H0 ,7X ,*BOUNDARY POINTS -- BODY AXES (STATIONLINE,BUTTLINE,WATER 00002990
XLINE)* 00003000
1 /1H ,3(18X ,*X* ,9X ,*Y* ,9X , 00003010
2 *7* ,2X)) 00003020
LINES=LINES+5 00003030
NPTS=DATAF(M2)+0.5 00003040
ND3=NPTS/3 00003050
DO 10 L=1,ND3 00003060
J=(L-1)*9+M2 00003070
K=(L-1)*3+1 00003080
KP1=K+1 00003090
KP2=K+2 00003100
IF((LINES+1).LE.50) GO TO 8 00003110
WRITE(6,102) (TTITLE(MMM),MMM=1,80) 00003120
WRITE(6,101) 00003130
WRITE(6,113) I 00003140
113 FORMAT(1H0,5X ,*FENCE NO.* ,I3/1H ,7X ,*BOUNDARY POINTS -- BODY AXES 00003150
X (STATIONLINE,BUTTLINE,WATERLINE)* 00003160
1 /1H ,3(18X ,*X* ,9X ,*Y* ,9X ,*2* ,2X)) 00003170
LINES=7 00003180
8 WRITE(6,114) K,(DATAF(J+M),M=1,3),KP1,(DATAF(J+M),M=4,6), 00003190
1 KP2,(DATAF(J+M),M=7,9) 00003200
114 FORMAT(1H ,2X ,3(6X ,*( ,I2 ,*)* ,2X ,2(F7.2,3X) ,F7.2,2X)) 00003210
10 LINES=LINES+1 00003220
IF((3*ND3+1).EQ.NPTS) GO TO 20 00003230
J=ND3*9+M2 00003240
K=3*ND3+1 00003250
IF((3*ND3+1).EQ.NPTS) WRITE(6,115) K,(DATAF(J+M),M=1,3) 00003260
KP1=K+1 00003270
IF((3*ND3+2).EQ.NPTS) WRITE(6,116) K,(DATAF(J+M),M=1,3), 00003280
1 KP1,(DATAF(J+M),M=4,6) 00003290
LINES=LINES+1 00003300
115 FORMAT(1H ,8X ,*( ,I2 ,*)* ,2X ,2(F7.2,3X) ,F7.2) 00003310
116 FORMAT(1H ,2X ,2(6X ,*( ,I2 ,*)* ,2X ,2(F7.2,3X) ,F7.2,2X)) 00003320
20 CONTINUE 00003330
25 CONTINUE 00003340
WRITE(6,102) (TTITLE(MMM),MMM=1,80) 00003350
WRITE(6,101) 00003360
NPANEL=DATA(23)+0.5 00003370
WRITE(6,117) DATA(23) 00003380
117 FORMAT(1H0,2X ,***REFLECTIVE SURFACE DATA*/1H ,5X ,*NO. OF SURFACES* 00003390
1 ,5X ,F3.0) 00003400
LINES=6 00003410
LT=0 00003420
DO 70 I=1,NPANEL 00003430
LT=LT+80 00003440
M2=MS(I)-20 00003450
IF((LINES+6).LE.50) GO TO 27 00003460
WRITE(6,102) (TTITLE(MMM),MMM=1,80) 00003470
WRITE(6,101) 00003480

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      LINES=3
      27 WRITE(6,118) I,(TITLES(LT+J),J=1,80)
      118 FORMAT(1H0,5X,*,REFLECTIVE SURFACE NO.,I3,5X,*,IDENTIFICATION: *,
      1 80A1)
      LINES=LINES+2
      IF((LINES+5).LE.50) GO TO 30
      WRITE(6,102) (TITLES(MMM),MMM=1,80)
      WRITE(6,101)
      LINES=3
      WRITE(6,118) I,(TITLES(LT+J),J=1,80)
      LINES=LINES+2
      30 WRITE(6,120) (DATAS(M2+J),J=1,9)
      120 FORMAT(1H0,7X,*,CURVE-FIT INPUT DATA*/1H,9X,*,DESIRED TERMS FOR CURVE-FITTING*/1H,11X,*,(1) X TERM *,F4.0,5X,*,(2) Y TERM *,F4.0,5X,*,(3) Z TERM *,F4.0,5X,*,(4) XY TERM *,F4.0,5X,*,(5) XZ TERM *,F4.0,5X,*,(6) YZ TERM *,F4.0,5X,*,(7) XSQ TERM *,F4.0,5X,*,(8) YSQ TERM *,F4.0,5X,*,(9) ZSQ TERM *,F4.0,5X,*,(10) CONSTANT *,E12.4)
      LINES=LINES+5
      IF((LINES+6).LE.50) GO TO 40
      WRITE(6,102) (TITLES(MMM),MMM=1,80)
      WRITE(6,101)
      LINES=3
      WRITE(6,118) I,(TITLES(LT+J),J=1,80)
      LINES=LINES+2
      40 WRITE(6,121) (DATAS(M2+J),J=10,18)
      121 FORMAT(1H0,9X,*,INPUT VALUES FOR COEFFICIENTS OF SURFACE*/1H,11X,*,(1) X COEF *,E12.4,5X,*,(2) Y COEF *,E12.4,5X,*,(3) Z COEF *,E12.4,5X,*,(4) XY COEF *,E12.4,5X,*,(5) XZ COEF *,E12.4,5X,*,(6) YZ COEF *,E12.4,5X,*,(7) XSQ COEF *,E12.4,5X,*,(8) YSQ COEF *,E12.4,5X,*,(9) ZSQ COEF *,E12.4,5X,*,(10) CONSTANT *,E12.4)
      LINES=LINES+6
      IF((LINES+4).LE.50) GO TO 50
      WRITE(6,102) (TITLES(MMM),MMM=1,80)
      WRITE(6,101)
      LINES=3
      WRITE(6,118) I,(TITLES(LT+J),J=1,80)
      LINES=LINES+2
      50 WRITE(6,122)
      122 FORMAT(1H0,7X,*,BOUNDARY POINTS -- BODY AXES (STATIONLINE,BUTTLINE,
      X,WATERLINE)*/1H,3(18X,*,X*,9X,*,Y*,9X,*,Z*,2X))
      LINES=LINES+3
      NPTS=DATAS(M2+20)+0.5
      ND3=NPTS/3
      DO 60 L=1,ND3
      J=(L-1)*9+20+M2
      K=(L-1)*3+1
      KP1=K+1
      KP2=K+2

```



6 LEVEL	21	OUTPT1	DATE = 78102	10/47/48
		IF((LINES+1).LE.50) GO TO 52		00004010
		WRITE(6,102) (TTITLE(MMM),MMM=1,80)		00004020
		WRITE(6,101)		00004030
		WRITE(6,118) I,(TTITLE(LT+K),K=1,80)		00004040
		LINES=5		00004050
52		WRITE(6,114) K,(DATAS(J+M),M=1,3),KP1,(DATAS(J+M),M=4,6),		00004060
	1	KP2,(DATAS(J+M),M=7,9)		00004070
60		LINES=LINES+1		00004080
		IF(3*ND3.EQ.NPTS) GO TO 70		00004090
		J=ND3*9+20*M2		00004100
		K=ND3*3+1		00004110
		IF((3*ND3+1).EQ.NPTS) WRITE(6,115) K,(DATAS(J+M),M=1,3)		00004120
		KP1=K+1		00004130
		IF((3*ND3+2).EQ.NPTS) WRITE(6,116) K,(DATAS(J+M),M=1,3),		00004140
	1	KP1,(DATAS(J+M),M=4,6)		00004150
		LINES=LINES+1		00004160
70		CONTINUE		00004170
		RETURN		00004180
		END		00004190

G LEVEL	21	CFITF	DATE = 78102	10/47/48
		SUBROUTINE CFITF(DATAF,ISTART,NPTS,COEFFB,ICOF,SIG,XCURF,FCURF)	00004200	
		REAL*8 XCURF(1),FCURF(1),COFB(3),SIG,DET	00004210	
		REAL*8 XPTS(10),YPTS(10),ZPTS(10)	00004211	
		DIMENSION IFIT(9)	00004212	
		DIMENSION DATAF(1),COEFFB(1)	00004220	
		CALL NORM(DATAF,ISTART,NPTS,TNORM)	00004230	
		DO 10 L=1,NPTS	00004250	
		LJ=(L-1)*3+ISTART-1	00004260	
		FCURF(L)=1.	00004270	
		XPTS(L)=DATAF(LJ+1)/TNORM	00004271	
		YPTS(L)=DATAF(LJ+2)/TNORM	00004272	
		ZPTS(L)=DATAF(LJ+3)/TNORM	00004273	
		DO 10 J=1,3	00004290	
		JJ=(L-1)*3+J	00004300	
10		XCURF(JJ)=DATAF(LJ+JJ)/TNORM	00004310	
		CALL CURFIT(FCURF,XCURF,3,NPTS,COFB,DET,SIG,1)	00004330	
		DO 15 I=1,3	00004331	
15		IFIT(I)=1	00004332	
		DO 18 I=4,9	00004333	
18		IFIT(I)=0	00004334	
		CALL SIGNF(COFB,3,DET,XPTS,YPTS,ZPTS,NPTS,IFIT)	00004340	
		L=(ICOF-1)*4	00004350	
		DO 20 I=1,3	00004360	
20		COEFFB(L+I)=COFB(I)/TNORM	00004370	
		COEFFB(L+4)=-DET	00004380	
		RETURN	00004390	
		END	00004400	

G LEVEL 21

NORM

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SUBROUTINE NORM(DATA,ISTART,NPTS,TNORM)

00004410

DIMENSION DATA(1)

00004420

TNORM=0.

00004430

DO 20 I=1,NPTS

00004440

L=(I-1)\*3+ISTART-1

00004450

DO 20 J=1,3

00004460

20 TNORM=TNORM+ DATA(L+J)\*\*2

00004470

TNORM=TNORM/3./NPTS

00004480

TNORM=SQRT(TNORM)

00004490

RETURN

00004500

END

00004510

G LEVEL 21

CURFIT

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	SUBROUTINE CURFIT(F,X,N,M,COEF,DET,SIG,NH)	00004520
	IMPLICIT REAL*8 (A-H,O-Z)	00004530
	DIMENSION A(9,9),B(9),X(1),F(1),COEF(1)	00004540
	DO 10 I=1,N	00004550
	B(I)=0.0	00004560
	DO 10 J=1,M	00004570
10	A(I,J)=0.0	00004580
	DO 20 I=1,M	00004590
	DO 20 J=1,N	00004600
	JJ=J+(I-1)*N	00004610
	B(J)=B(J)+F(I)*X(JJ)	00004620
	DO 20 L=1,N	00004630
	LL=L+(I-1)*N	00004640
20	A(L,J)=A(L,J)+X(JJ)*X(LL)	00004650
	CALL EQNSOL(A,B,N,COEF,DET,NH)	00004660
	SIG=0.0	00004670
	DO 40 I=1,M	00004680
	SUM=0.0	00004690
	DO 30 J=1,N	00004700
	JJ=J+(I-1)*N	00004710
30	SUM=SUM+COEF(J)*X(JJ)	00004720
	SUM=SUM-DET	00004730
40	SIG=SIG+SUM*SUM	00004740
	SIG=DSQRT(SIG/M)	00004750
	RETURN	00004760
	END	00004770



G LEVEL	21	SIGNF	DATE = 78102	10/47/48
		SUBROUTINE SIGNF(COFB,NCOFS,DET,XPTS,YPTS,ZPTS,NPTS,IFIT)		00004780
		REAL*8 VNORM(3),XVECT(3),XMAG,VMAG,DSQRT		00004781
		REAL*8 COFB(1),DET,XPTS(1),YPTS(1),ZPTS(1)		00004790
		DIMENSION IFIT(1)		00004791
		COSANG=0.		00004792
		DO 20 L=1,NPTS		00004793
		XMAG=DSQRT(XPTS(L)*XPTS(L)+YPTS(L)*YPTS(L)+ZPTS(L)*ZPTS(L))		00004794
		IF(XMAG.LT.1.0D-10) GO TO 20		00004795
		XVECT(1)=XPTS(L)/XMAG		00004796
		XVECT(2)=YPTS(L)/XMAG		00004797
		XVECT(3)=ZPTS(L)/XMAG		00004798
		DO 1 I=1,3		00004799
1		VNORM(I)=0.		00004800
		I=0		00004801
		IF(IFIT(1).EQ.0) GO TO 2		00004802
		I=I+1		00004803
		VNORM(1)=VNORM(1)+COFB(I)		00004804
		IF(I.EQ.NCOFS) GO TO 10		00004805
2		IF(IFIT(2).EQ.0) GO TO 3		00004806
		I=I+1		00004807
		VNORM(2)=VNORM(2)+COFB(I)		00004808
		IF(I.EQ.NCOFS) GO TO 10		00004809
3		IF(IFIT(3).EQ.0) GO TO 4		00004810
		I=I+1		00004811
		VNORM(3)=VNORM(3)+COFB(I)		00004812
		IF(I.EQ.NCOFS) GO TO 10		00004813
4		IF(IFIT(4).EQ.0) GO TO 5		00004814
		I=I+1		00004815
		VNORM(1)=VNORM(1)+COFB(I)*YPTS(L)		00004816
		VNORM(2)=VNORM(2)+COFB(I)*XPTS(L)		00004817
		IF(I.EQ.NCOFS) GO TO 10		00004818
5		IF(IFIT(5).EQ.0) GO TO 6		00004819
		I=I+1		00004820
		VNORM(1)=VNORM(1)+COFB(I)*ZPTS(L)		00004821
		VNORM(3)=VNORM(3)+COFB(I)*XPTS(L)		00004822
		IF(I.EQ.NCOFS) GO TO 10		00004823
6		IF(IFIT(6).EQ.0) GO TO 7		00004824
		I=I+1		00004825
		VNORM(2)=VNORM(2)+COFB(I)*ZPTS(L)		00004826
		VNORM(3)=VNORM(3)+COFB(I)*YPTS(L)		00004827
		IF(I.EQ.NCOFS) GO TO 10		00004828
7		IF(IFIT(7).EQ.0) GO TO 8		00004829
		I=I+1		00004830
		VNORM(1)=VNORM(1)+2.*COFB(I)*XPTS(L)		00004831
		IF(I.EQ.NCOFS) GO TO 10		00004832
8		IF(IFIT(8).EQ.0) GO TO 9		00004833
		I=I+1		00004834
		VNORM(2)=VNORM(2)+2.*COFB(I)*YPTS(L)		00004835
		IF(I.EQ.NCOFS) GO TO 10		00004836
9		IF(IFIT(9).EQ.0) GO TO 10		00004837
		I=I+1		00004838
		VNORM(3)=VNORM(3)+2.*COFB(I)*ZPTS(L)		00004839

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10	VMAG=DSQRT(VNORM(1)*VNORM(1)+VNORM(2)*VNORM(2)+VNORM(3)*	00004840
1	VNORM(3))	00004841
	IF(VMAG.EQ.0) GO TO 1000	00004842
	DO 11 I=1,3	00004843
11	VNORM(I)=VNORM(I)/VMAG	00004844
	DO 12 I=1,3	00004845
12	COSANG=COSANG+VNORM(I)*XVECT(I)	00004846
20	CONTINUE	00004847
	IF(COSANG.EQ.0) GO TO 2000	00004848
	IF(COSANG.GT.0) RETURN	00004849
	DO 28 J=1,NCOFS	00004850
28	COFB(J)=-COFB(J)	00004851
	DET=-DET	00004852
	RETURN	00004853
1000	WRITE(6,200)	00004854
200	FORMAT(1H1,*MAGNITUDE OF NORMAL VECTOR IS ZERO IN SIGNF*)	00004855
	STOP	00004856
2000	WRITE(6,201)	00004857
201	FORMAT(1H0,*WARNING TEST IN SIGNF SHOWS VECTORS PERPENDICULAR*)	00004858
	RETURN	00004859
	END	00004860

G LEVEL	21	EQNSOL	DATE = 78102	10/47/48
		SUBROUTINE EQNSOL(A,B,N,X,DET,NHOMO)		00005000
		IMPLICIT REAL*8 (A-H,O-S,U-Z)		00005010
		REAL*8 TOL		00005020
		DIMENSION A(9,9),B(1),X(1)		00005030
		COMMON/TOLRS/TOLEQN,TOLSNT,TOLQPT,TOLINT,TOLCK1,TOLCK2,		00005040
		1 TOLCK4,TOELT,TOLCIR,TANGS2,TOLPLT		00005050
		TOL=TOLEQN		00005060
		NRANK=N		00005070
		DO 10 I=1,N		00005080
10		X(I)=0.0		00005090
		I=0		00005100
		ICOL=0		00005110
12		I=I+1		00005120
		ICOL=ICOL+1		00005130
		IPI=I+1		00005140
14		AMAXI=A(I,ICOL)		00005150
		L=I		00005160
		IF(IPI.GT.N) GO TO 150		00005170
		DO 15 K=IPI,N		00005180
		IF(DABS(A(K,ICOL)).GT.DABS(AMAXI)) L=K		00005190
15		AMAXI=A(L,ICOL)		00005200
150		IF(DABS(AMAXI).GT.TOL) GO TO 16		00005210
		X(ICOL)=1.0		00005220
		NRANK=NRANK-1		00005230
		IF(ICOL.EQ.N) GO TO 45		00005240
		ICOL=ICOL+1		00005250
		GO TO 14		00005260
16		IF(L.EQ.I) GO TO 25		00005270
		DO 20 J=1,N		00005280
		SWAP=A(I,J)		00005290
		A(I,J)=A(L,J)		00005300
20		A(L,J)=SWAP		00005310
		SWAP=B(I)		00005320
		B(I)=B(L)		00005330
		B(L)=SWAP		00005340
25		XDIV=A(J,ICOL)		00005350
		DO 30 J=ICOL,N		00005360
30		A(I,J)=A(I,J)/XDIV		00005370
		B(I)=B(I)/XDIV		00005380
		IF(IPI.GT.N) GO TO 42		00005390
		DO 40 K=IPI,N		00005400
		XMUL=A(K,ICOL)		00005410
		DO 35 J=ICOL,N		00005420
35		A(K,J)=A(K,J)-XMUL*A(I,J)		00005430
40		B(K)=B(K)-XMUL*B(I)		00005440
		IF(ICOL.LT.N) GO TO 12		00005450
42		IF(NRANK.EQ.N.OR.NHOMO.EQ.0) X(ICOL)=B(I)/A(I,ICOL)		00005460
45		IJUMP=ICOL-I		00005470
		DO 50 I=2,N		00005480
		K=N-I+1		00005490
		IF(X(K).EQ.0.0) GO TO 47		00005500
		IJUMP=IJUMP-1		00005510

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	GO TO 50	00005520
47	IF(NRANK.EQ.N.OR.NHOMO.EQ.0) X(K)=B(K)	00005530
	KP1=K+1	00005540
	DO 48 J=KP1,N	00005550
48	X(K)=X(K)-A(K-IJUMP,J)*X(J)	00005560
50	CONTINUE	00005570
	DET=1.0	00005580
	IF(NRANK.LT.N) DET=0.0	00005590
	RETURN	00005600
	END	00005610



G LEVEL	21	CFITS	DATE = 78102	10/47/48
		SUBROUTINE CFITS(DATAC,DATAS,ISTART,NPTS,COEFSB,ICOF,SIG,XCURF,	00005620	
	1	FCURF)	00005630	
		DIMENSION DATAC(1),DATAS(1),COEFSB(1),IFIT(9)	00005640	
		DIMENSION SIGMA(8),DETERM(8)	00005650	
		REAL*8 XCURF(1),FCURF(1),COFB(9),SIG,DET	00005660	
		REAL*8 XPTS(30),YPTS(30),ZPTS(30)	00005661	
		IDFLT=DATAC(1)+0.5	00005670	
		IPASS=0	00005680	
		CALL NORM(DATAS,ISTART,NPTS,TNORM)	00005690	
		L=ISTART-21	00005700	
		DO 5 I=1,9	00005710	
	5	IFIT(I)=DATAS(L+I)+0.5	00005720	
		IF(IDFLT.EQ.0) GO TO 8	00005721	
		DO 6 I=1,3	00005722	
	6	IFIT(I)=1	00005723	
	8	CONTINUE	00005724	
		NCOEFS=0	00005730	
		DO 10 I=1,9	00005740	
	10	IF(IFIT(I).EQ.1) NCOEFS=NCOEFS+1	00005750	
		IF(NPTS.LT.NCOEFS) GO TO 50	00005760	
	15	CONTINUE	00005770	
		IPASS=IPASS+1	00005780	
		DO 35 L=1,NPTS	00005790	
		LJ=(L-1)*NCOEFS	00005800	
		IJ=(L-1)*3+ISTART	00005810	
		XV=DATAS(IJ)/TNORM	00005820	
		YV=DATAS(IJ+1)/TNORM	00005830	
		ZV=DATAS(IJ+2)/TNORM	00005840	
		XPTS(L)=XV	00005841	
		YPTS(L)=YV	00005842	
		ZPTS(L)=ZV	00005843	
		I=0	00005860	
		IF(IFIT(1).EQ.0) GO TO 310	00005870	
		I=I+1	00005880	
		XCURF(LJ+I)=XV	00005890	
	310	IF(IFIT(2).EQ.0) GO TO 311	00005900	
		I=I+1	00005910	
		XCURF(LJ+I)=YV	00005920	
	311	IF(IFIT(3).EQ.0) GO TO 312	00005930	
		I=I+1	00005940	
		XCURF(LJ+I)=ZV	00005950	
	312	IF(IFIT(4).EQ.0) GO TO 313	00005960	
		I=I+1	00005970	
		XCURF(LJ+I)=XV+YV	00005980	
	313	IF(IFIT(5).EQ.0) GO TO 314	00005990	
		I=I+1	00006000	
		XCURF(LJ+I)=XV+ZV	00006010	
	314	IF(IFIT(6).EQ.0) GO TO 315	00006020	
		I=I+1	00006030	
		XCURF(LJ+I)=YV+ZV	00006040	
	315	IF(IFIT(7).EQ.0) GO TO 316	00006050	
		I=I+1	00006060	

6 LEVEL	21	CFITS	DATE = 78102	10/47/48
		XCURF(LJ+I)=XV*XV		00006070
316		IF(IFIT(8).EQ.0) GO TO 317		00006080
		I=I+1		00006090
		XCURF(LJ+I)=YV*YV		00006100
317		IF(IFIT(9).EQ.0) GO TO 35		00006110
		I=I+1		00006120
		XCURF(LJ+I)=ZV*ZV		00006130
35		FCURF(L)=1.		00006140
		CALL CURFIT(FCURF,XCURF,NCOEFS,NPTS,COFB,DET,SIG,1)		00006160
		CALL SIGNF(COFB,NCOEFS,DET,XPTS,YPTS,ZPTS,NPTS,IFIT)		00006170
		IF(IDEFLT.EQ.0) GO TO 350		00006180
		IF(IPASS.EQ.9) GO TO 350		00006190
		SIGMA(IPASS)=SIG		00006200
		DETERM(IPASS)=DET		00006210
		GO TO (318,319,320,321,322,323,324,325), IPASS		00006220
318		IF(NPTS.LE.3) GO TO 350		00006230
		NCOEFS=4		00006240
		IFIT(7)=1		00006250
		GO TO 15		00006260
319		IFIT(7)=0		00006270
		IFIT(8)=1		00006280
		GO TO 15		00006290
320		IFIT(8)=0		00006300
		IFIT(9)=1		00006310
		GO TO 15		00006320
321		IF(NPTS.LE.4) GO TO 325		00006330
		NCOEFS=5		00006340
		IFIT(7)=1		00006350
		IFIT(8)=1		00006360
		IFIT(9)=0		00006370
		GO TO 15		00006380
322		IFIT(8)=0		00006390
		IFIT(9)=1		00006400
		GO TO 15		00006410
323		IFIT(7)=0		00006420
		IFIT(8)=1		00006430
		GO TO 15		00006440
324		IF(NPTS.LE.5) GO TO 325		00006450
		NCOEFS=6		00006460
		IFIT(7)=1		00006470
		GO TO 15		00006480
325		IMATCH=0		00006490
3250		SIG=SIGMA(1)		00006500
		L=1		00006510
		NCOEFS=8		00006520
		IF(NPTS.EQ.4) NCOEFS=4		00006530
		IF(NPTS.EQ.5) NCOEFS=7		00006540
		DO 326 I=2,NCOEFS		00006550
		IF(ABS(DETERM(I)).LT.0.5.AND.IMATCH.EQ.0) GO TO 326		00006560
		IF(SIGMA(I).LT.SIG) L=I		00006570
		IF(L.EQ.I) SIG=SIGMA(I)		00006580
326		CONTINUE		00006590

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	IF(IMATCH.EQ.0.AND.SIG.LT.1.00-08) GO TO 327	00006600
	IF(IMATCH.EQ.1.AND.SIG.LT.1.00-06) GO TO 327	00006610
	IF(IMATCH.EQ.1) GO TO 60	00006620
	IMATCH=1	00006630
	GO TO 3250	00006640
327	IFIT(7)=0	00006650
	IFIT(8)=0	00006660
	IFIT(9)=0	00006670
	NCOEFS=3	00006680
	IF(L.GT.1) NCOEFS=4	00006690
	IF(L.GT.4) NCOEFS=5	00006700
	IF(L.EQ.8) NCOEFS=6	00006710
	IPASS=8	00006720
	GO TO (15,328,329,330,331,332,333,334), L	00006730
328	IFIT(7)=1	00006740
	GO TO 15	00006750
329	IFIT(8)=1	00006760
	GO TO 15	00006770
330	IFIT(9)=1	00006780
	GO TO 15	00006790
331	IFIT(7)=1	00006800
	IFIT(8)=1	00006810
	GO TO 15	00006820
332	IFIT(7)=1	00006830
	IFIT(9)=1	00006840
	GO TO 15	00006850
333	IFIT(8)=1	00006860
	IFIT(9)=1	00006870
	GO TO 15	00006880
334	IFIT(7)=1	00006890
	IFIT(8)=1	00006900
	IFIT(9)=1	00006910
	GO TO 15	00006920
350	CONTINUE	00006930
	L=(ICOF-1)*10	00006940
	J=0	00006950
	DO 40 I=1,10	00006960
	COEFSB(L+I)=0.	00006970
	IF(I.EQ.10) GO TO 36	00006980
	IF(IFIT(I).EQ.0) GO TO 40	00006990
	J=J+1	00007000
36	COEFSB(L+I)=DATAS(ISTART+I-12)	00007010
	IF(COEFSB(L+I).NE.0.) GO TO 40	00007020
	IF(I.EQ.10) GO TO 38	00007030
	COEFSB(L+I)=COFB(J)/TNORM	00007040
	IF(I.LE.3) GO TO 40	00007050
	COEFSB(L+I)=COEFSB(L+I)/TNORM	00007060
	GO TO 40	00007070
38	COEFSB(L+I)=-DET	00007080
40	CONTINUE	00007090
	RETURN	00007100
50	WRITE(6,100) ICOF	00007110

G LEVEL 21

CFITS

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```
100 FORMAT(1H1,*REFLECTIVE SURFACE NO. *,I3,* HAS NOT BEEN DEFINED BY 00007120
1ENOUGH POINTS*) . 00007130
STOP 00007140
60 WRITE(6,110) I00F 00007150
110 FORMAT(1H1,*BOUNDARY POINTS FOR REFLECTIVE SURFACE NO. *,I3, 00007160
1 * DO NOT FORM A CURVE-FIT WITHIN ERROR TOLERANCE*/ 00007170
2 1H0,*PROGRAM WILL CONTINUE WITH BEST FIT POSSIBLE*) 00007180
GO TO 327 00007190
END 00007200
```



G LEVEL 21

OUTPT2

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	SUBROUTINE OUTPT2(COEFB,SIG,NSETS,TITLES,LOOP)	00007210
	DIMENSION COEFB(1),TITLES(1),SIG(1)	00007220
	WRITE(6,102) (TITLES(MM),MM=1,80)	00007230
102	FORMAT(1H1,80A1)	00007240
	WRITE(6,103)	00007250
103	FORMAT(1H0,46X,'*** RESULTS OF CURVE-FIT ANALYSIS ***')	00007260
	GO TO (10,50), LOOP	00007270
10	CONTINUE	00007280
	WRITE(6,110)	00007290
110	FORMAT(1H0,2X,'**FENCE DATA**')	00007300
	LINES=5	00007310
	DO 20 I=1,NSETS	00007320
	LL=(I-1)*4	00007330
	IF((LINES+6).LE.50) GO TO 15	00007340
	WRITE(6,102) (TITLES(MM),MM=1,80)	00007350
	WRITE(6,103)	00007360
	WRITE(6,110)	00007370
	LINES=5	00007380
15	WRITE(6,112) I	00007390
112	FORMAT(1H0,5X,'**FENCE NO.**,I3)	00007400
	LINES=LINES+2	00007410
	WRITE(6,121) (COEFB(LL+L),L=1,4)	00007420
121	FORMAT(1H0,9X,'VALUES FOR COEFFICIENTS OF SURFACE*/1H ,11X,	00007430
	1 *(1) X COEF *,E12.4,5X,(2) Y COEF *,E12.4,5X,(3) Z COEF *,E12.4,5X,(4) CONSTANT *,E12.4)	00007440
	WRITE(6,123) SIG(I)	00007450
123	FORMAT(1H0,9X,'ROOT MEAN SQUARE ERROR OF FIT=*,E12.4)	00007460
	LINES=LINES+5	00007470
20	CONTINUE	00007480
	RETURN	00007490
50	CONTINUE	00007500
	WRITE(6,117)	00007510
117	FORMAT(1H0,2X,'**REFLECTIVE SURFACE DATA**')	00007520
	LINES=5	00007530
	LT=0	00007540
	DO 60 I=1,NSETS	00007550
	LT=LT+80	00007560
	LL=(I-1)*10	00007570
	IF((LINES+9).LE.50) GO TO 55	00007580
	WRITE(6,102) (TITLES(MM),MM=1,80)	00007590
	WRITE(6,103)	00007600
	WRITE(6,117)	00007610
	LINES=5	00007620
55	WRITE(6,118) I,(TITLES(LT+MM),MM=1,80)	00007630
118	FORMAT(1H0,5X,'**REFLECTIVE SURFACE NO.**,I3,5X,'IDENTIFICATION: ',	00007640
	1 80A1)	00007650
	LINES=LINES+2	00007660
	WRITE(6,122) (COEFB(LL+L),L=1,10)	00007670
122	FORMAT(1H0,9X,'VALUES FOR COEFFICIENTS OF SURFACE*/1H ,11X,(1) X	00007680
	1 COEF *,E12.4,5X,(2) Y COEF *,E12.4,5X,(3) Z COEF *,E12.4,	00007690
	2 1H ,11X,(4) XY COEF *,E12.4,5X,(5) XZ COEF *,E12.4,5X,	00007700
	3 *(6) YZ COEF *,E12.4/1H ,11X,(7) XSQ COEF *,E12.4,5X,	00007710
		00007720

G LEVEL 21

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4	*(8) YSQ COEF *,E12.4,5X,*(9) ZSQ COEF *,E12.4/1H ,10X,	00007730
5	*(10) CONSTANT *,E12.4)	00007740
	WRITE(6,123) SIG(I)	00007750
	LINES=LINES+8	00007760
60	CONTINUE	00007770
	RETURN	00007780
	END	00007790

6 LEVEL 21

GLINT

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SUBROUTINE GLINT(DATAC,DATAS,MS,COEFSB,GAMMA,ALPHA2,BETA2,INTRFL, 00007800
1 ISHADOW,INTERF,DWORKS,DATAF,MF) 00007810
DIMENSION ALPHA2(1),BETA2(1),INTRFL(1),ISHADOW(1),INTERF(1) 00007820
DIMENSION DATAC(1),DATAS(1),MS(1),COEFSB(1) 00007830
DIMENSION DWORKS(1),DATAF(1),MF(1) 00007840
DIMENSION SUN(3),DIRCOS(3,3),XB(3),SUNB(3),VNORMB(3),X(3), 00007850
1 RFLTNB(3),RFLTN(3) 00007860
DATA ONE,ZERO,RAD/1.0E00,0.0E00,57.29578E00/ 00007870
SUN(1)=-COS(GAMMA/RAD) 00007880
SUN(2)=0. 00007890
SUN(3)=-SIN(GAMMA/RAD) 00007900
DQ2=-DATAC(15)*DATAC(15)*144. 00007910
THETA=DATAC(4) 00007920
PHI=DATAC(5) 00007930
SNTH=SIN(THETA/RAD) 00007940
CSTH=COS(THETA/RAD) 00007950
SNPH=SIN(PHI/RAD) 00007960
CSPH=COS(PHI/RAD) 00007970
SPST=SNPH*SNTH 00007980
SPCT=SNPH*CSTH 00007990
CPST=CSPH*SNTH 00008000
CPCT=CSPH*CSTH 00008010
DIRCOS(1,3)=-SNTH 00008020
DIRCOS(2,3)=-SPCT 00008030
DIRCOS(3,3)=CPCT 00008040
DPSI=DATAC(11) 00008050
NPSI=DATAC(9)*0.5 00008060
NFENCE=DATAC(22)*0.5 00008070
NPANEL=DATAC(23)*0.5 00008080
MAS=0 00008090
DO 100 I=1,NPANEL 00008100
N10=(I-1)*10 00008110
KI=MS(I) 00008120
NPTS=DATAS(KI)*0.5 00008130
PSIKP=DATAC(10)-DPSI 00008140
DO 60 J=1,NPSI 00008150
PSIKP=PSIKP+DPSI 00008160
PSI=PSIKP 00008170
IF(PSIKP.LT.-179.) PSI=-179. 00008180
IF(PSIKP.GT.179.) PSI=179. 00008190
IF(PSIKP.GT.-91.AND.PSIKP.LT.-89.) PSI=-89. 00008200
IF(PSIKP.LT.91.AND.PSIKP.GT.89.) PSI=89. 00008210
SNPS=SIN(PSI/RAD) 00008220
CSPS=COS(PSI/RAD) 00008230
DIRCOS(1,1)=-CSTH*CSPS 00008240
DIRCOS(1,2)=-CSTH*SNPS 00008250
DIRCOS(2,1)=SPST*CSPS-SNPS*CSPH 00008260
DIRCOS(2,2)=SPST*SNPS+CSPS*CSPH 00008270
DIRCOS(3,1)=-CPST*CSPS-SNPS*SNPH 00008280
DIRCOS(3,2)=-CPST*SNPS+SNPH*CSPS 00008290
DO 20 M=1,3 00008300
SUNB(M)=0. 00008310

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G LEVEL	21	GLINT	DATE = 78102	10/47/48
		DO 20 K=1,3		00008320
20		SUNB(M)=SUNB(M)+DIRCOS(M,K)*SUN(K)		00008330
		DO 75 L=1,NPTS		00008340
		MAS=MAS+1		00008350
		INTRFL(MAS)=0		00008360
		ISHADW(MAS)=0		00008370
		INTERF(MAS)=0		00008380
		N3=(L-1)*3+KI		00008390
		DO 10 M=1,3		00008400
10		XB(M)=DATAS(N3+M)		00008410
		IF(NFENCE.GT.0) CALL SHADOW(DATAF,MF,NFENCE,XB,SUNB,ISHADW,		00008420
		1 MAS,DWORKS)		00008430
		VNORMB(1)=COEFSB(N10+1)+COEFSB(N10+4)*XB(2)+COEFSB(N10+5)*XB(3)+		00008440
		1 2.*COEFSB(N10+7)*XB(1)		00008450
		VNORMB(2)=COEFSB(N10+2)+COEFSB(N10+4)*XB(1)+COEFSB(N10+6)*XB(3)+		00008460
		1 2.*COEFSB(N10+8)*XB(2)		00008470
		VNORMB(3)=COEFSB(N10+3)+COEFSB(N10+5)*XB(1)+COEFSB(N10+6)*XB(2)+		00008480
		1 2.*COEFSB(N10+9)*XB(3)		00008490
		ASN=0.		00008500
		ABSNSQ=0.		00008510
		DO 30 M=1,3		00008520
		ASN=ASN+SUNB(M)*VNORMB(M)		00008530
30		ABSNSQ=ABSNSQ+VNORMB(M)**2		00008540
		ASN=ASN/SQRT(ABSNSQ)		00008550
		IF(ASN.GT.0.001745) INTRFL(MAS)=1		00008560
		DO 40 M=1,3		00008570
40		RFLTNB(M)=SUNB(M)-2.*ASN*VNORMB(M)/SQRT(ABSNSQ)		00008580
		IF(NFENCE.GT.0) CALL INTERF(DATAF,MF,NFENCE,XB,RFLTNB,INTERF,		00008590
		1 MAS,DWORKS)		00008600
		DO 50 M=1,3		00008610
		RFLTN(M)=0.		00008620
		X(M)=0.		00008630
		DO 50 K=1,3		00008640
		RFLTN(M)=RFLTN(M)+DIRCOS(K,M)*RFLTNB(K)		00008650
50		X(M)=X(M)+DIRCOS(K,M)*XB(K)		00008660
		CALL QUADPT(ONE,ONE,ZERO,ZERO,ZERO,ZERO,ZERO,ZERO,ZERO,DQ2,		00008670
		1 RFLTN(1),RFLTN(2),RFLTN(3),X(1),X(2),X(3),XI1,YI1,ZI1,XI2,		00008680
		2 YI2,ZI2,INTC)		00008690
		IF(INTC.EQ.1) GO TO 55		00008700
		CALL SORNOT(RFLTN(1),RFLTN(2),RFLTN(3),X(1),X(2),X(3),XI1,YI1,ZI1,		00008710
		1 ISHAD)		00008720
		IF(ISHAD.EQ.1) GO TO 55		00008730
		XI1=XI2		00008740
		YI1=YI2		00008750
		ZI1=ZI2		00008760
55		CONTINUE		00008770
		ALPHA2(MAS)=RAD*ATAN2(ZI1,SQRT(XI1*XI1+YI1*YI1))		00008780
		BETA2(MAS)=RAD*ATAN2(YI1,XI1)		00008790
75		CONTINUE		00008800
60		CONTINUE		00008810
100		CONTINUE		00008820
		RETURN		00008830



G LEVEL 21

GLINT

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END

00008840

G LEVEL	21	SHADOW	DATE = 78102	10/47/48
		SUBROUTINE SHADOW(DATAF,MF,NFENCE,XBS,SUNB,ISHADW,MAS,DWORKS)	00008850	
		DIMENSION DATAF(1),MF(1),XBS(1),SUNB(1),ISHADW(1),DWORKS(1),XBF(3)	00008860	
		APL=-SUNB(1)	00008870	
		BPL=-SUNB(2)	00008880	
		CPL=-SUNB(3)	00008890	
		DPL=-APL*XBS(1)-BPL*XBS(2)-CPL*XBS(3)	00008900	
		THETA=0.	00008910	
		IF (APL.NE.0.0.OR.CPL.NE.0.0) THETA=ATAN2(APL,CPL)	00008920	
		ALPHA=ATAN2(BPL,SQRT(APL*APL+CPL*CPL))	00008930	
		SNTH=SIN(THETA)	00008940	
		CSTH=COS(THETA)	00008950	
		SNAL=SIN(ALPHA)	00008960	
		CSAL=COS(ALPHA)	00008970	
		SAST=SNAL*SNTH	00008980	
		SACT=SNAL*CSTH	00008990	
		CAST=CSAL*SNTH	00009000	
		CACT=CSAL*CSTH	00009010	
		DO 50 I=1,NFENCE	00009020	
		KF=MF(I)	00009030	
		NPTSF=DATAF(KF)+0.5	00009040	
		DO 30 J=1,NPTSF	00009050	
		LI=(J-1)*3	00009060	
		LK=(J-1)*2	00009070	
		DO 10 K=1,3	00009080	
10		XBF(K)=DATAF(LI*K+1)	00009090	
		CALL PLANPT(APL,BPL,CPL,DPL,SUNB(1),SUNB(2),SUNB(3),DISC,XBF(1),	00009100	
		1 XBF(2),XBF(3),XINTP,YINTP,ZINTP)	00009110	
		CALL SORNOT(SUNB(1),SUNB(2),SUNB(3),XBF(1),XBF(2),XBF(3),XINTP,	00009120	
		1 YINTP,ZINTP,ISH)	00009130	
		IF (ISH.EQ.0) GO TO 50	00009140	
20		DWORKS(LK+1)=XINTP*CSTH-ZINTP*SNTH	00009150	
		DWORKS(LK+2)=-XINTP*SAST+YINTP*CSAL-ZINTP*SACT	00009160	
30		CONTINUE	00009170	
		XC=XBS(1)*CSTH-XBS(3)*SNTH	00009180	
		YC=-XBS(1)*SAST+XBS(2)*CSAL-XBS(3)*SACT	00009190	
		CALL CIRCLE(DWORKS,NPTSF,XC,YC,INCR)	00009200	
		IF (INCR.EQ.0) GO TO 50	00009210	
		ISHADW(MAS)=1	00009220	
		GO TO 60	00009230	
50		CONTINUE	00009240	
60		RETURN	00009250	
		END	00009260	

G LEVEL	21	PLANPT	DATE = 78102	10/47/48
		SUBROUTINE PLANPT(A,B,C,D,SL,SM,SN,DISC,X1,Y1,Z1,X,Y,Z)		00009270
		COMMON/TOLRS/TOLEQN,TOLSNY,TOLQPT,TOLINT,TOLCK1,TOLCK2,		00009280
		1 TOLCK4,DELT,TOLCIR,ANGST2,TOL		00009290
		IF(ABS(SL).GE.ABS(SN).AND.ABS(SL).GE.ABS(SM)) DISC=A+B*SM/SL+		00009300
		1 C*SN/SL		00009310
		IF(ABS(SL).LT.ABS(SN).AND.ABS(SM).LE.ABS(SN)) DISC=A*SL/SM+		00009320
		1 B*SM/SM+C		00009330
		IF(ABS(SL).LT.ABS(SM).AND.ABS(SN).LT.ABS(SM)) DISC=A*SL/SM+		00009340
		1 B+C*SN/SM		00009350
		IF(ABS(DISC).LT.TOL) RETURN		00009360
		IF(ABS(SL).LT.ABS(SN).AND.ABS(SM).LE.ABS(SN)) GO TO 10		00009370
		IF(ABS(SL).LT.ABS(SM).AND.ABS(SN).LT.ABS(SM)) GO TO 20		00009380
		X=(-D-B*Y1+B*X1*SM/SL-C*Z1+C*X1*SN/SL)/DISC		00009390
		Y=Y1+SM*(X-X1)/SL		00009400
		Z=Z1+SN*(X-X1)/SL		00009410
		RETURN		00009420
10		Z=(-D-A*X1+A*Z1*SL/SM-B*Y1+B*Z1*SM/SM)/DISC		00009430
		X=X1+SL*(Z-Z1)/SM		00009440
		Y=Y1+SM*(Z-Z1)/SM		00009450
		RETURN		00009460
20		Y=(-D-A*X1+A*SL*Y1/SM-C*Z1+C*SN*Y1/SM)/(A*SL/SM+B+C*SN/SM)		00009470
		X=X1+SL*(Y-Y1)/SM		00009480
		Z=Z1+SN*(Y-Y1)/SM		00009490
		RETURN		00009500
		END		00009510

G LEVEL 21

SORNOT

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SUBROUTINE SORNOT(SL,SM,SN,X1,Y1,Z1,X,Y,Z,ISHAD)	00009520
COMMON/TOLRS/TOLEQN,TOL,TOLQPT,TOLINT,TOLCK1,TOLCK2,	00009530
1 TOLCK4,DELT,TOLCIR,ANGST2,TOLPLT	00009540
ISHAD=2	00009550
SL1=X-X1	00009560
SM1=Y-Y1	00009570
SN1=Z-Z1	00009580
IF((ABS(SL1)+ABS(SM1)+ABS(SN1)).LT.TOL) RETURN	00009590
DIR=0.0	00009600
IF(ABS(SL).GT.TOL) DIR=SL1/SL	00009610
IF(ABS(SM).GT.TOL) DIR=DIR+SM1/SM	00009620
IF(ABS(SN).GT.TOL) DIR=DIR+SN1/SN	00009630
ISHAD=1	00009640
IF(DIR.LT.0.0) ISHAD=0	00009650
RETURN	00009660
END	00009670



G LEVEL	21	INTFER	DATE = 78102	10/47/48
		SUBROUTINE INTFER(DATAF,MF,NFENCE,XBS,RFLTNB,INTERF,MAS,DWORKS)		00009680
		DIMENSION DATAF(1),MF(1),XBS(1),RFLTNB(1),INTERF(1),DWORKS(1),		00009690
	1	XBF(3)		00009700
		APL=-RFLTNB(1)		00009710
		BPL=-RFLTNB(2)		00009720
		CPL=-RFLTNB(3)		00009730
		DPL=-APL*XBS(1)-BPL*XBS(2)-CPL*XBS(3)		00009740
		THETA=0.		00009750
		IF(APL.NE.0.0.OR.CPL.NE.0.0) THETA=ATAN2(APL,CPL)		00009760
		ALPHA=ATAN2(BPL,SQRT(APL*APL+CPL*CPL))		00009770
		SNTH=SIN(THETA)		00009780
		CSTH=COS(THETA)		00009790
		SNAL=SIN(ALPHA)		00009800
		CSAL=COS(ALPHA)		00009810
		SAST=SNAL*SNTH		00009820
		SACT=SNAL*CSTH		00009830
		CAST=CSAL*SNTH		00009840
		CACT=CSAL*CSTH		00009850
		DO 50 I=1,NFENCE		00009860
		KF=MF(I)		00009870
		NPTSF=DATAF(KF)+0.5		00009880
		DO 30 J=1,NPTSF		00009890
		LI=(J-1)*3		00009900
		LK=(J-1)*2		00009910
		DO 10 K=1,3		00009920
10		XBF(K)=DATAF(LI+K+1)		00009930
		CALL PLANPT(APL,BPL,CPL,DPL,RFLTNB(1),RFLTNB(2),RFLTNB(3),DISC,		00009940
	1	XBF(1),XBF(2),XBF(3),XINTP,YINTP,ZINTP)		00009950
		CALL SORNOT(RFLTNB(1),RFLTNB(2),RFLTNB(3),XBF(1),XBF(2),XBF(3),		00009960
	1	XINTP,YINTP,ZINTP,ISH)		00009970
		IF(ISH.EQ.1) GO TO 50		00009980
20		DWORKS(LK+1)=XINTP*CSTH-ZINTP*SNTH		00009990
		DWORKS(LK+2)=-XINTP*SAST+YINTP*CSAL-ZINTP*SACT		00010000
30		CONTINUE		00010010
		XC=XBS(1)*CSTH-XBS(3)*SNTH		00010020
		YC=-XBS(1)*SAST+XBS(2)*CSAL-XBS(3)*SACT		00010030
		CALL CIRCLE(DWORKS,NPTSF,XC,YC,INCR)		00010040
		IF(INCR.EQ.0) GO TO 50		00010050
		INTERF(MAS)=1		00010060
		GO TO 60		00010070
50		CONTINUE		00010080
60		RETURN		00010090
		END		00010100

G LEVEL 21

QUADPT

DATE = 78102

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SUBROUTINE QUADPT(A,B,C,D,E,F,G,H,CK,CL,SL,SM,SN,X1,Y1,Z1,XI1,YI1,00010110
1 ZI1,XI2,YI2,ZI2,INTC) 00010120
COMMON/TOLRS/TOLEQN,TOLSN,TOL,TOLINT,TOLCK1,TOLCK2, 00010130
1 TOLCK4,DELT,TOLCIR,ANGST2,TOLPLT 00010140
INTC=0 00010150
IF(ABS(SL).LT.ABS(SN).AND.ABS(SM).LE.ABS(SN)) GO TO 30 00010160
IF(ABS(SL).LT.ABS(SM).AND.ABS(SN).LT.ABS(SM)) GO TO 50 00010170
SA=A+B*(SM/SL)**2+C*(SN/SL)**2+D*SM/SL+F*SM*SN/SL**2+E*SN/SL 00010180
SB=2.*B*Y1*SM/SL-2.*B*X1*(SM/SL)**2+2.*C*Z1*SN/SL-2.*C*X1* 00010190
1 (SN/SL)**2+D*Y1-D*X1*SM/SL+E*Z1-E*X1*SN/SL+F*Z1*SM/SL-F*X1*SM* 00010200
2 SN/SL**2+F*Y1*SN/SL-F*X1*SM*SN/SL**2+G*H*SM/SL+CK*SN/SL 00010210
SC=B*Y1*Y1+B*X1*X1*(SM/SL)**2+C*Z1*Z1-2.*B*Y1*X1*SM/SL+C*X1*X1* 00010220
1 (SN/SL)**2-2.*C*X1*Z1*SN/SL+F*Y1*Z1-F*X1*Y1*SN/SL-F*X1*Z1*SM/SL+ 00010230
2 F*X1*X1*SM*SN/SL**2+H*Y1-H*X1*SM/SL+CK*Z1-CK*X1*SN/SL+CL 00010240
ICONTR=1 00010250
5 DISC=SB*SB-4.*SA*SC 00010260
IF(DISC.LT. ABS(SA)/10.) RETURN 00010270
IF(DISC.LT.0.0) RETURN 00010280
IF(ABS(SA).GE.TOL) GO TO 10 00010290
IF(ABS(SB).LT.TOL) RETURN 00010300
XI1=-SC/SB 00010310
INTC=1 00010320
IF(ICONTR.EQ.2) GO TO 60 00010330
IF(ICONTR.EQ.3) GO TO 40 00010340
GO TO 20 00010350
10 XI1=-SB/SA/2.+SQRT(DISC)/SA/2. 00010360
XI2=-SB/SA/2.-SQRT(DISC)/SA/2. 00010370
INTC=2 00010380
IF(ICONTR.EQ.2) GO TO 60 00010390
IF(ICONTR.EQ.3) GO TO 40 00010400
20 YI1=Y1+SM*(XI1-X1)/SL 00010410
ZI1=Z1+SN*(XI1-X1)/SL 00010420
IF(INTC.EQ.1) RETURN 00010430
YI2=Y1+SM*(XI2-X1)/SL 00010440
ZI2=Z1+SN*(XI2-X1)/SL 00010450
RETURN 00010460
30 SA=C+B*(SM/SN)**2+A*(SL/SN)**2+F*SM/SN+E*SL/SN+D*SM*SL/SN**2 00010470
SB=2.*B*Y1*SM/SN-2.*B*Z1*(SM/SN)**2+2.*A*X1*SL/SN-2.*A*Z1* 00010480
1 (SL/SN)**2+F*Y1-F*Z1*SM/SN+E*X1-E*Z1*SL/SN+D*X1*SM/SN-D*Z1*SM* 00010490
2 SL/SN**2+D*Y1*SL/SN-D*Z1*SM*SL/SN**2+CK*H*SM/SN+G*SL/SN 00010500
SC=B*Y1*Y1+B*Z1*Z1*(SM/SN)**2-2.*B*Y1*Z1*SM/SN+A*X1*X1+A*Z1*Z1* 00010510
1 (SL/SN)**2-2.*A*X1*Z1*SL/SN+D*Y1*X1-D*Y1*Z1*SL/SN-D*X1*Z1*SM/SN+ 00010520
2 D*Z1*Z1*SM*SL/SN**2+H*Y1-H*Z1*SM/SN+G*X1-G*Z1*SL/SN+CL 00010530
ICONTR=3 00010540
GO TO 5 00010550
40 ZI1=XI1 00010560
YI1=Y1+SM*(ZI1-Z1)/SN 00010570
XI1=X1+SL*(ZI1-Z1)/SN 00010580
IF(INTC.EQ.1) RETURN 00010590
ZI2=XI2 00010600
YI2=Y1+SM*(ZI2-Z1)/SN 00010610
XI2=X1+SL*(ZI2-Z1)/SN 00010620

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6 LEVEL	21	QUADPT	DATE = 78102	10/47/48
		RETURN		00010630
50		SA=B+A*(SL/SM)**2+C*(SN/SM)**2+D*SL/SM+E*SL*SN/SM**2+F*SN/SM		00010640
		SB=2.*A*X1*SL/SM-2.*A*Y1*(SL/SM)**2+2.*C*Z1*SN/SM-2.*C*Y1*		00010650
		1 (SN/SM)**2+D*X1-D*Y1*SL/SM+E*X1*SN/SM+E*Z1*SL/SM-2.*E*Y1*SL*SN/		00010660
		2 SM**2+F*Z1-F*Y1*SN/SM+G*SL/SM+H*CK*SN/SM		00010670
		SC=A*X1*X1+A*Y1*Y1*(SL/SM)**2-2.*A*Y1*X1*SL/SM+C*Z1*Z1+C*Y1*Y1*		00010680
		1 (SN/SM)**2-2.*C*Y1*Z1*SN/SM+E*X1*Z1-E*X1*Y1*SN/SM-E*Y1*Z1*SL/SM+		00010690
		2 E*Y1*Y1*SL*SN/SM**2+G*X1-G*Y1*SL/SM+CK*Z1-CK*Y1*SN/SM+CL		00010700
		ICONTR=2		00010710
		GO TO 5		00010720
60		YI1=XI1		00010730
		XI1=X1+SL*(YI1-Y1)/SM		00010740
		ZI1=Z1+SN*(YI1-Y1)/SM		00010750
		IF (INTC.EQ.1) RETURN		00010760
		YI2=XI2		00010770
		XI2=X1+SL*(YI2-Y1)/SM		00010780
		ZI2=Z1+SN*(YI2-Y1)/SM		00010790
		RETURN		00010800
		END		00010810

G LEVEL	21	OUTPT3	DATE = 78102	10/47/48
		SUBROUTINE OUTPT3(DATA, DATAS, MS, TITLES, GAMMA, ALPHA2, BETA2,		00010820
	1	INTRFL, ISHADOW, INTERF)		00010830
		DIMENSION INTRFL(1), ISHADOW(1), INTERF(1)		00010840
		DIMENSION DATA(1), DATAS(1), MS(1), ALPHA2(1), BETA2(1), TITLES(1)		00010850
		LT=0		00010860
		MAS=0		00010870
		NPSI=DATA(9)+0.5		00010880
		DPSI=DATA(11)		00010890
		NPANEL=DATA(23)+0.5		00010900
		DO 90 I=1, NPANEL		00010910
		K=MS(I)		00010920
		NPTS=DATAS(K)+0.5		00010930
		WRITE(6,102) (TITLES(MM), MM=1,80)		00010940
		LT=LT+80		00010950
		WRITE(6,101) I, (TITLES(LT+MM), MM=1,80)		00010960
102		FORMAT(1H1,80A1)		00010970
101		FORMAT(1H0,51X,*** SUN GLINT SIGNATURE ***/1H0,5X,*REFLECTIVE SU		00010980
		IRFACE NO.*,I3,5X,*IDENTIFICATION: *,80A1)		00010990
		WRITE(6,103) GAMMA, DATA(12), DATA(4), DATA(13), DATA(5),		00011000
	1	DATA(14), DATA(15)		00011010
103		FORMAT(1H0,5X,*SUN ELEVATION*,F12.2,76X,*XROT*,F9.2/		00011020
	1	1H,5X,*A/C PITCH ATTITUDE*,F7.2,76X,*YROT*,F9.2/1H,5X,*A/C ROLL		00011030
	2	ATTITUDE*,F8.2,76X,*ZROT*,F9.2/1H,106X,*DISTG*,F8.2)		00011040
		WRITE(6,104)		00011050
104		FORMAT(1H0,5X,*A/C YAW*,20X,*BOUNDARY POINTS -- BODY AXES*,7X,		00011060
	X	*STATUS FLAGS FOR POINTS*,18X,		00011070
	1	*GLINT*/1H,30X,* (STATIONLINE,BUTTLINE,WATERLINE)*,5X,		00011080
	Y	*INTRFL*,4X,*ISHAD*,4X,*INTRF*,11X,		00011090
	2	*AZIMUTH*,3X,*ELEVATION*/1H,36X,*X*,9X,*Y*,9X,*Z*)		00011100
		LINES=13		00011110
		PSI=DATA(10)-DPSI		00011120
		DO 60 J=1,NPSI		00011130
		PSI=PSI+DPSI		00011140
		DC 75 L=1,NPTS		00011150
		MAS=MAS+1		00011160
		N3=(L-1)*3+K		00011170
		XB=DATAS(N3+1)+DATA(12)		00011180
		YB=DATAS(N3+2)+DATA(13)		00011190
		ZB=DATAS(N3+3)+DATA(14)		00011200
		WRITE(6,105) PSI, XB, YB, ZP, INTRFL(MAS), ISHADOW(MAS), INTERF(MAS),		00011210
	1	BETA2(MAS), ALPHA2(MAS)		00011220
105		FORMAT(1H0,5X,F7.2,19X,F8.2,2F10.2,10X,I1,8X,I1,8X,I1,13X,F7.2,		00011230
	1	4X,F6.2)		00011240
		LINES=LINES+2		00011250
75		CONTINUE		00011260
60		CONTINUE		00011270
90		CONTINUE		00011280
		RETURN		00011290
		END		00011300



AD-A061 322

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CANOPY SUN GLINT EVALUATION COMPUTER PROGRAM.(U)  
SEP 78 F WHITE

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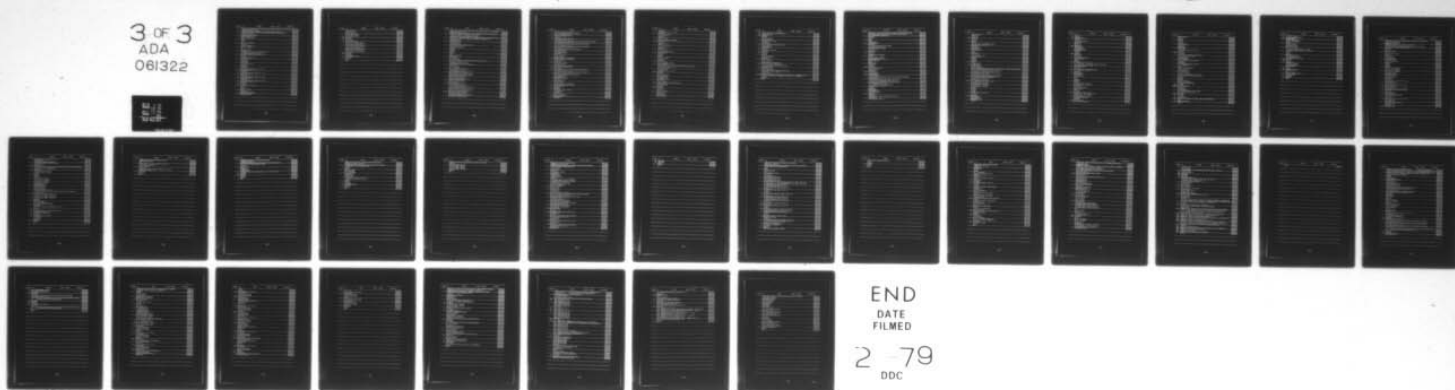
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G LEVEL 21

MINMAX

DATE = 78103

08/54/44

SUBROUTINE MINMAX(DATA, DATAS, MS, ALPHA2, BETA2, APLT, BPLOT, INTRFL,	00011310
1 ISHADW, INTERF, IPLTOL)	00011320
DIMENSION DATA(1), DATAS(1), MS(1), ALPHA2(1), BETA2(1),	00011330
1 APLT(1), BPLOT(1), INTRFL(1), ISHADW(1), INTERF(1), IPLTOL(1)	00011340
IRFLT=DATA(3)+0.5	00011350
NPANEL=DATA(23)+0.5	00011360
NPSI=DATA(9)+0.5	00011370
NPSI=4*(NPSI-1)+1	00011380
IST=1	00011390
MAS=0	00011400
LAS=0	00011410
DO 70 I=1, NPANEL	00011420
KN=MS(I)	00011430
NPTS=DATAS(KN)+0.5	00011440
DO 60 J=1, NPSI	00011450
NP=0	00011460
DO 50 L=1, NPTS	00011470
MAS=MAS+1	00011480
IF (INTRFL(MAS).NE.IRFLT) GO TO 50	00011490
IF (ISHADW(MAS).EQ.1) GO TO 50	00011500
IF (INTERF(MAS).EQ.1) GO TO 50	00011510
NP=NP+1	00011520
IF (NP.GT.1) GO TO 10	00011530
BLOW=BETA2(MAS)	00011540
KBMIN=MAS	00011550
BHIGH=BLOW	00011560
KBMAX=MAS	00011570
ALOW=ALPHA2(MAS)	00011580
KAMIN=MAS	00011590
AHIGH=ALOW	00011600
KAMAX=MAS	00011610
10 IF (BETA2(MAS).GE.BLOW) GO TO 20	00011620
BLOW=BETA2(MAS)	00011630
KBMIN=MAS	00011640
20 IF (BETA2(MAS).LE.BHIGH) GO TO 30	00011650
BHIGH=BETA2(MAS)	00011660
KBMAX=MAS	00011670
30 IF (ALPHA2(MAS).GE.ALOW) GO TO 40	00011680
ALOW=ALPHA2(MAS)	00011690
KAMIN=MAS	00011700
40 IF (ALPHA2(MAS).LE.AHIGH) GO TO 50	00011710
AHIGH=ALPHA2(MAS)	00011720
KAMAX=MAS	00011730
50 CONTINUE	00011740
IF (NP.GT.0) GO TO 55	00011750
AAVG=0.	00011760
BAVG=0.	00011770
DO 52 L=1, NPTS	00011780
M=MAS-L+1	00011790
BAVG=BAVG+BETA2(M)	00011800
52 AAVG=AAVG+ALPHA2(M)	00011810
AAVG=AAVG/NPTS	00011820
	00011830
	00011840
	00011850
	00011860

G LEVEL 21

MINMAX

DATE = 78103

08/54/44

	BAVG=BAVG/NPTS	00011870
	DO 54 L=1,4	00011880
	IPLTOL(LAS+L)=1	00011890
	APLOT(LAS+L)=AAVG	00011900
54	BPLLOT(LAS+L)=BAVG	00011910
	GO TO 58	00011920
55	CONTINUE	00011930
	DO 56 L=1,4	00011940
56	IPLTOL(LAS+L)=0	00011950
	APLOT(LAS+1)=AHIGH*0.25	00011960
	BPLLOT(LAS+1)=BETA2(KAMAX)	00011970
	BPLLOT(LAS+2)=BLOW*0.25	00011980
	APLOT(LAS+2)=ALPHA2(KBMIN)	00011990
	APLOT(LAS+3)=ALOW*0.25	00012000
	BPLLOT(LAS+3)=BETA2(KAMIN)	00012010
	BPLLOT(LAS+4)=BHIGH*0.25	00012020
	APLOT(LAS+4)=ALPHA2(KBMAX)	00012030
58	LAS=LAS+4	00012040
60	CONTINUE	00012050
	IST=NPSI4+4	00012080
	NPSI4=NPSI4+4*NPSI	00012090
70	CONTINUE	00012100
	RETURN	00012110
	END	00012120

G LEVEL 21

PROBL

DATE = 78163

08/54/44

SUBROUTINE PROBL(DATA, DATAS, MS, APLOT, BPLOT, XPLOT, YPLOT, DWORKS,	00012130
10WKSP2, VPROBL, IPLTOL)	00012140
DIMENSION DATA(1), DATAS(1), MS(1), APLOT(1), BPLOT(1), XPLOT(1),	00012150
1 YPLOT(1), DWORKS(1), DWKSP2(1), IPLTOL(1)	00012160
DIMENSION RPS(200), RPSN(200), SPS(200)	00012170
DIMENSION RPSINP(500), NINP(20), RPSOUT(500), NOUT(20), RPSWK1(500),	00012180
1 NWK1(20), RPSWK2(500), NWK2(20), RPSWK3(500), NWK3(20)	00012190
ALOW=DATA(16)	00012200
AHIGH=DATA(17)	00012210
BETH=DATA(19)	00012220
BETL=DATA(18)	00012230
TAREA=(AHIGH-ALOW)*(BETH-BETL)	00012240
NPANEL=DATA(23)*0.5	00012250
NPSI=DATA(9)*0.5	00012260
NCUMI=C	00012270
NSURFI=0	00012280
SWEEP=0.	00012290
LASP=0	00012300
LAS=0	00012310
DO 14 I=1, NPANEL	00012320
NPSIP=NPSI	00012330
NPSIS=NPSI+1	00012340
DO 8 J=1, NPSI	00012350
IF(IPLTOL(LASP+1).EQ.0.AND.NPSIS.GT.NPSI) NPSIS=J	00012360
IF(NPSIS.GT.NPSI) GO TO 8	00012370
IF(NPSIP.LT.NPSI) GO TO 8	00012380
IF(IPLTOL(LASP+1).EQ.1) NPSIP=J-1	00012390
8 LASP=LASP+4	00012400
DO 12 J=1, NPSI	00012410
IF(J.LT.NPSIS) GO TO 12	00012420
IF(J.GT.NPSIP) GO TO 12	00012430
IF((NPSIP-NPSIS).EQ.0) GO TO 9	00012440
IF(J.GT.NPSIS) GO TO 10	00012450
BAVG1=BPLOT(LAS+4)+BPLOT(LAS+2)	00012460
BAVG2=BPLOT(LAS+8)+BPLOT(LAS+6)	00012470
XPLOT(1)=BPLOT(LAS+4)	00012480
YPLOT(1)=APLOT(LAS+4)	00012490
IF(BAVG1.GE.BAVG2) GO TO 10	00012500
9 XPLOT(1)=BPLOT(LAS+2)	00012510
YPLOT(1)=APLOT(LAS+2)	00012520
10 LP=J-NPSIS+2	00012530
XPLOT(LP)=BPLOT(LAS+1)	00012540
YPLOT(LP)=APLOT(LAS+1)	00012550
IF((NPSIP-NPSIS).EQ.0) GO TO 100	00012560
IF(J.LT.NPSIP) GO TO 11	00012570
BAVG1=BPLOT(LAS+4)+BPLOT(LAS+2)	00012580
BAVG2=BPLOT(LAS)+BPLOT(LAS-2)	00012590
100 XPLOT(LP+1)=BPLOT(LAS+4)	00012600
YPLOT(LP+1)=APLOT(LAS+4)	00012610
IF((NPSIP-NPSIS).EQ.0) GO TO 11	00012620
IF(BAVG1.GE.BAVG2) GO TO 11	00012630
XPLOT(LP+1)=BPLOT(LAS+2)	00012640



G LEVEL	21	PROBL	DATE = 78103	08/54/44
		YPL0T(LP+1)=APLOT(LAS+2)		00012650
11		LP=2*(NPSIP-NPSIS+1)+3-(J-NPSIS+1)		00012660
		XPL0T(LP)=BPL0T(LAS+3)		00012670
		YPL0T(LP)=APLOT(LAS+3)		00012680
12		LAS=LAS+4		00012690
		IF(NPSIS.GT.NPSI) GO TO 18		00012700
		NCFS=2*(NPSIP-NPSIS+1)+2		00012710
		CALL SORT2(XPL0T,YPL0T,NCFS,NCFS1,NCFS2,DWORKS,DWKSP2)		00012740
		IF(NCFS2.EQ.0) GO TO 16		00012750
		CALL SORT(YPL0T,XPL0T,NCFS1,BETH,BETL,DWKSP2)		00012760
		IF(NCFS1.EQ.0) GO TO 14		00012770
		CALL SORT(XPL0T,YPL0T,NCFS1,AHIGH,ALOW,DWKSP2)		00012780
		IF(NCFS1.EQ.0) GO TO 14		00012790
		CALL AREA(XPL0T,YPL0T,NCFS1,YINTG)		00012800
		SWEEP=SWEEP+YINTG		00012830
		NSURFI=NSURFI+1		00012840
		NINP(NSURFI)=NCFS1		00012850
		N2=2*NCFS1		00012860
		DO 13 L=1,NCFS1		00012870
		J2=(L-1)*2+1		00012880
		RPSINP(NCUMI+J2)=XPL0T(L)		00012890
13		RPSINP(NCUMI+J2+1)=YPL0T(L)		00012900
		NCUMI=NCUMI+N2		00012910
14		CONTINUE		00012920
		DO 15 KKK=1,NCFS2		00012930
		LML=(KKK-1)*2		00012940
		XPL0T(KKK)=DWORKS(LML+1)		00012950
15		YPL0T(KKK)=DWORKS(LML+2)		00012960
		NCFS=NCFS2		00012970
16		CALL SORT(YPL0T,XPL0T,NCFS,BETH,BETL,DWKSP2)		00012980
		IF(NCFS.EQ.0) GO TO 18		00012990
		CALL SORT(XPL0T,YPL0T,NCFS,AHIGH,ALOW,DWKSP2)		00013000
		IF(NCFS.EQ.0) GO TO 18		00013010
		CALL AREA(XPL0T,YPL0T,NCFS,YINTG)		00013020
		SWEEP=SWEEP+YINTG		00013050
		NSURFI=NSURFI+1		00013060
		NINP(NSURFI)=NCFS		00013070
		N2=2*NCFS		00013080
		DO 17 L=1,NCFS		00013090
		J2=(L-1)*2+1		00013100
		RPSINP(NCUMI+J2)=XPL0T(L)		00013110
17		RPSINP(NCUMI+J2+1)=YPL0T(L)		00013120
		NCUMI=NCUMI+N2		00013130
18		CONTINUE		00013140
		VPROBL=0.		00013150
		IF(NSURFI.EQ.0) RETURN		00013160
		NPTS=NINP(1)		00013230
		N2=2*NPTS		00013240
		DO 30 L=1,N2		00013250
30		RPSOUT(L)=RPSINP(L)		00013260
		NOUT(1)=NPTS		00013270
		NSURFO=1		00013280

6 LEVEL 21

PROBL

DATE = 78103

08/54/44

	NCUM0=N2	00013290
	IF(NSURFI.EQ.1) GO TO 85	00013300
	NCUM1=N2	00013310
	DO 60 I=2,NSURFI	00013320
	NR=NINP(I)	00013330
	N2=2*NR	00013340
	DO 40 L=1,N2	00013350
40	RPSWK1(L)=RPSINP(L*NCUM1)	00013360
	NWK1(L)=NR	00013370
	NSWK1=1	00013380
	NCUM1=NCUM1+N2	00013390
	NSUM=0	00013400
	DO 70 K=1,NSURFO	00013410
	NS=NOUT(K)	00013420
	M2=2*NS	00013430
	DO 50 L=1,M2	00013440
50	SPS(L)=RPSOUT(NSUM+L)	00013450
	NSUM=NSUM+M2	00013460
	NCUM1=0	00013470
	NCUM3=0	00013480
	NSWK3=0	00013490
	DO 62 J=1,NSWK1	00013500
	NR=NWK1(J)	00013510
	N2=2*NR	00013520
	DO 55 L=1,N2	00013530
55	RPS(L)=RPSWK1(L*NCUM1)	00013540
	NCUM1=NCUM1+N2	00013570
	CALL OVRLAP(RPS,NR,SPS,NS,RPSWK2,NSWK2,NWK2,RPSN)	00013610
	IF(NSWK2.EQ.0) GO TO 80	00013620
	DO 550 NI=1,NSWK2	00013630
	NPTS=NWK2(NI)	00013640
	IF(NPTS.GT.50) GO TO 80	00013650
550	CONTINUE	00013660
	NCUM2=0	00013670
	DO 60 NI=1,NSWK2	00013680
	NSWK3=NSWK3+1	00013690
	NPTS=NWK2(NI)	00013700
	NWK3(NSWK3)=NPTS	00013710
	N2=2*NPTS	00013720
	DO 56 L=1,N2	00013730
56	RPSWK3(NCUM3+L)=RPSWK2(NCUM2+L)	00013740
	NCUM2=NCUM2+N2	00013750
	NCUM3=NCUM3+N2	00013760
60	CONTINUE	00013770
62	CONTINUE	00013780
	NSWK1=NSWK3	00013790
	NCUM1=0	00013800
	DO 68 J=1,NSWK1	00013810
	NPTS=NWK3(J)	00013820
	N2=2*NPTS	00013830
	NWK1(J)=NPTS	00013840
	DO 65 L=1,N2	00013850

G LEVEL	21	PROBL	DATE = 78103	08/54/44
65	RPSWK1(NCUM1+L)=RPSWK3(NCUM1+L)			00013860
68	NCUM1=NCUM1+N2			00013870
70	CONTINUE			00013880
	NCUM1=0			00013890
	DO 74 J=1,NSWK1			00013900
	NPTS=NSWK1(J)			00013910
	NOUT(NSURFO+J)=NPTS			00013920
	N2=2*NPTS			00013930
	DO 72 L=1,N2			00013940
72	RPSOUT(NSUM+L)=RPSWK1(NCUM1+L)			00013950
	NCUM1=NCUM1+N2			00013960
	NSUM=NSUM+N2			00013970
74	CONTINUE			00013980
	NSURFO=NSURFO+NSWK1			00013990
80	CONTINUE			00014000
85	CONTINUE			00014010
	NCUMO=0			00014120
	SWA2=0.			00014150
	DO 95 I=1,NSURFO			00014160
	NPTS=NOUT(I)			00014170
	N2=2*NPTS			00014180
	DO 93 L=1,NPTS			00014200
	L2=(L-1)*2+1			00014210
	XPLOT(L)=RPSOUT(NCUMO+L2)			00014220
93	YPLOT(L)=RPSOUT(NCUMO+L2+1)			00014230
	CALL AREA(XPLOT,YPLOT,NPTS,YINTG)			00014250
	SWA2=SWA2+YINTG			00014280
95	NCUMO=NCUMO+N2			00014290
	VPROBL=SWA2/TAREA			00014330
	IF(SWA2.GT.SWEEP) VPROBL=SWEEP/TAREA			00014340
	IF(VPROBL.LE.1.) RETURN			00014341
	WRITE(6,200)			00014342
200	FORMAT(1H0,'WARNING PROGRAM HAD DIFFICULTY ACCOUNTING FOR',			00014343
	1* OVERLAP PROBABILITY GREATER THAN ONE, ONE ASSUMED*)			00014344
	VPROBL=1.			00014345
	RETURN			00014350
	END			00014360



6 LEVEL	21	OVRLAP	DATE = 78102	10/47/48
		SUBROUTINE OVRLAP(RPS,NR,SPS,NS,RPSIN,NRPLSN,NRPTSN,RPSN)		00014370
		DIMENSION RPS(1),SPS(1),RPSN(1),RPSIN(1),NRPTSN(1)		00014380
		CALL CHECK4(RPS,NR,SPS,NS)		00014390
		NRPLSN=0		00014400
		NSUM=0		00014410
		IR=1		00014420
		IR2=1		00014430
16		XC=RPS(IR2)		00014440
		YC=RPS(IR2+1)		00014450
		NS2=2*NS		00014460
		CALL CIRCLE(SPS,NS,XC,YC,INCR)		00014470
		IF(INCR.NE.2) GO TO 17		00014480
		IF(IR.EQ.NR) GO TO 120		00014490
		IR=IR+1		00014500
		IR2=2*IR-1		00014510
		GO TO 16		00014520
17		IFLAG=5		00014530
		IF(INCR.EQ.1) IFLAG=6		00014540
		NEXT=0		00014550
		IF(IFLAG.EQ.6) NRN=0		00014560
		IF(IFLAG.EQ.6) GO TO 25		00014570
		NRPLSN=NRPLSN+1		00014580
		NRN=1		00014590
		RPSN(1)=XC		00014600
		RPSN(2)=YC		00014610
		IFLAG=1		00014620
25		IRP1=IR+1		00014630
		IF(IR.EQ.NR) IRP1=1		00014640
		IR2P1=2*IRP1-1		00014650
		IDOUBL=0		00014660
30		X1=RPS(IR2)		00014670
		Y1=RPS(IR2+1)		00014680
35		X2=RPS(IR2P1)		00014690
		Y2=RPS(IR2P1+1)		00014700
		CALL INTERC(SPS,NS,X1,Y1,X2,Y2,X,Y,KL,IFAUULT,IDOUBL,		00014710
		1 XALSO,YALSO)		00014720
		IF(IFLAG.EQ.6.AND.IFAUULT.EQ.0) GO TO 70		00014730
		IF(IFLAG.EQ.1.AND.IFAUULT.EQ.0) GO TO 40		00014740
		IF(IFLAG.EQ.4.AND.IFAUULT.EQ.0) GO TO 40		00014750
		IF(IFLAG.EQ.6) GO TO 38		00014760
		CALL CHECK1(X2,Y2,RPSN,NRN,ICLK)		00014770
		IF(ICLK.EQ.1) GO TO 90		00014780
		IFLAG=1		00014790
		NRN=NRN+1		00014800
		NRN2=2*NRN-1		00014810
		RPSN(NRN2)=X2		00014820
		RPSN(NRN2+1)=Y2		00014830
38		IR=IRP1		00014840
		IR2=2*IR-1		00014850
		IF(IRP1.EQ.1.AND.IFLAG.EQ.6) GO TO 90		00014860
		IRP1=IR+1		00014870
		IF(IR.EQ.NR) IRP1=1		00014880



G LEVEL	21	OVRLAP	DATE = 78102	10/47/48
		IR2P1=2*IRP1-1		00014890
		IDOUBL=0		00014900
		GO TO 30		00014910
40		IFLAG=2		00014920
		NEXT=IRP1		00014930
		XSEP=X		00014940
		YSEP=Y		00014950
		CALL CHECK1(X,Y,RPSN,NRN,ICLK)		00014960
		IF(ICLK.EQ.1) GO TO 90		00014970
		NRN=NRN+1		00014980
		NRN2=2*NRN-1		00014990
		RPSN(NRN2)=X		00015000
		RPSN(NRN2+1)=Y		00015010
		IS=KL		00015020
		IS2=2*IS-1		00015030
		ISP1=IS+1		00015040
		IF(IS.EQ.NS) ISP1=1		00015050
		IS2P1=2*ISP1-1		00015060
		IDOUBL=1		00015070
		XALSO=X		00015080
		YALSO=Y		00015090
		KDIR=0		00015100
50		X1=SPS(IS2)		00015110
		Y1=SPS(IS2+1)		00015120
		X2=SPS(IS2P1)		00015130
		Y2=SPS(IS2P1+1)		00015140
		CALL INTERC(RPS,NR,X1,Y1,X2,Y2,X,Y,KL,IFAUULT,IDOUBL,XALSO,YALSO)		00015150
		IF(IFLAG.EQ.2.AND.IFAUULT.EQ.0) GO TO 75		00015160
		IF(IFLAG.EQ.3.AND.IFAUULT.EQ.0) GO TO 75		00015170
		IF(IFLAG.EQ.3.AND.KDIR.EQ.1) GO TO 60		00015180
		IF(IFLAG.EQ.3) GO TO 56		00015190
		IF(IFLAG.EQ.7.AND.IFAUULT.EQ.0) GO TO 75		00015200
		IF(IFLAG.EQ.7.AND.KDIR.EQ.1) GO TO 54		00015210
		CALL CIRCLE(RPS,NR,X1,Y1,INCR)		00015220
		IF(INCR.EQ.1) GO TO 56		00015230
		IF(IFLAG.EQ.1) GO TO 30		00015240
54		CALL CIRCLE(RPS,NR,X2,Y2,INCR)		00015250
		IF(INCR.EQ.1) GO TO 60		00015260
		IF(IFLAG.EQ.7) IFLAG=1		00015270
		IF(IFLAG.EQ.1) GO TO 30		00015280
		IF(IFLAG.EQ.7) IFLAG=1		00015290
		IFLAG=7		00015300
		IDOUBL=1		00015310
		XALSO=X		00015320
		YALSO=Y		00015330
		IF(INCR.EQ.0) GO TO 58		00015340
		GO TO 68		00015350
56		NRN=NRN+1		00015360
		NRN2=2*NRN-1		00015370
		RPSN(NRN2)=X1		00015380
		RPSN(NRN2+1)=Y1		00015390
		IDOUBL=0		00015400

G LEVEL	21	OVRLAP	DATE = 78102	10/47/48
		IFLAG=3		00015410
58		ISP1=IS		00015420
		IS2P1=2*ISP1-1		00015430
		IS=IS-1		00015440
		IF (IS.EQ.0) IS=NS		00015450
		IS2=2*IS-1		00015460
		KDIR=-1		00015470
		GO TO 50		00015480
60		NRN=NRN+1		00015490
		NRN2=2*NRN-1		00015500
		RPSN(NRN2)=X2		00015510
		RPSN(NRN2+1)=Y2		00015520
		IDOUBL=0		00015530
		IFLAG=3		00015540
68		IS=ISP1		00015550
		IS2=2*IS-1		00015560
		ISP1=IS+1		00015570
		IF (IS.EQ.NS) ISP1=1		00015580
		IS2P1=2*ISP1-1		00015590
		KDIR=1		00015600
		GO TO 50		00015610
70		IF (NRPLSN.EQ.0) GO TO 74		00015620
		CALL CHECK2(X,Y,RPSIN,NRPLSN,NRPTSN,ICLK2)		00015630
		IF (ICLK2.EQ.1) GO TO 120		00015640
74		NRPLSN=NRPLSN+1		00015650
		GO TO 76		00015660
75		CALL CHECK1(X,Y,RPSN,NRN,ICLK)		00015670
		IF (ICLK.EQ.1) GO TO 90		00015680
76		NRN=NRN+1		00015690
		NRN2=2*NRN-1		00015700
		RPSN(NRN2)=X		00015710
		RPSN(NRN2+1)=Y		00015720
		X1=X		00015730
		Y1=Y		00015740
		IDOUBL=1		00015750
		XALSO=X		00015760
		YALSO=Y		00015770
		IF (IFLAG.EQ.6) IFLAG=1		00015780
		IF (IFLAG.EQ.1) GO TO 35		00015790
		IRP1=KL+1		00015800
		IF (KL.EQ.NR) IRP1=1		00015810
		IR2P1=2*IRP1-1		00015820
		IFLAG=4		00015830
		GO TO 35		00015840
90		IF (NRN.EQ.0) GO TO 120		00015850
		IF (NRN.LE.2) NRPLSN=NRPLSN-1		00015860
		IF (NRN.LE.2) GO TO 120		00015870
		IF (NEXT.EQ.0) GO TO 100		00015880
		NRPTSN(NRPLSN)=NRN		00015890
		N2=2*NRN		00015900
		DO 95 I=1,N2		00015910
95		RPSIN(I+NSUM)=RPSN(I)		00015920

6 LEVEL 21	OVRLAP	DATE = 78102	10/47/48
	NSUM=NSUM+N2		00015930
	NRN=0		00015940
	X1=XSEP		00015950
	Y1=YSEP		00015960
	IFLAG=6		00015970
	IRP1=NEXT		00015980
	IR2P1=2*IRP1-1		00015990
	IDOUBL=1		00016000
	XALSO=XSEP		00016010
	YALSO=YSEP		00016020
	IF(NRPLSN.EQ.5) GO TO 120		00016030
	GO TO 35		00016040
100	X1=SPS(1)		00016050
	Y1=SPS(2)		00016060
	CALL CIRCLE(RPSN, NRN, X1, Y1, INCR)		00016070
	IF(INCR.EQ.0) GO TO 110		00016080
	X1=RPSN(NRN2)		00016090
	Y1=RPSN(NRN2+1)		00016100
	CALL CLOSE(SPS, NS, X1, Y1, KN)		00016110
	X1=RPSN(1)		00016120
	Y1=RPSN(2)		00016130
	CALL CLOSE(SPS, NS, X1, Y1, K1)		00016140
	DO 103 KOIR=1,2		00016150
	K=KN		00016160
	IFACT=(-1)**(KOIR+1)		00016170
	DO 102 I=1, NS		00016180
	L=K+IFACT*(I-1)		00016190
	IF(L.GT.NS) L=1		00016200
	IF(L.LT.1) L=NS		00016210
	IF(L.EQ.1.AND.KDIR.EQ.1) K=2-I		00016220
	IF(L.EQ.NS.AND.KDIR.EQ.2) K=NS-I-1		00016230
	L2=2*L-1		00016240
	M=NRN+I		00016250
	M2=2*M-1		00016260
	RPSN(M2)=SPS(L2)		00016270
	RPSN(M2+1)=SPS(L2+1)		00016280
	IF(L.EQ.K1) GO TO 1020		00016290
102	CONTINUE		00016300
1020	DO 1025 KK=1, NS		00016310
	KK2=2*KK-1		00016320
	X1=SPS(KK2)		00016330
	Y1=SPS(KK2+1)		00016340
	CALL CIRCLE(RPSN, M, X1, Y1, INCR)		00016350
	IF(INCR.EQ.1) GO TO 103		00016360
1025	CONTINUE		00016370
	GO TO 104		00016380
103	CONTINUE		00016390
	WRITE(6, 200)		00016400
200	FORMAT(1H1, *SOMETHING WRONG OVRLAP SUBROUTINE*)		00016410
	STOP		00016420
104	NRPTSN(NRPLSN)=M		00016430
	N2=2*M		00016440



G	LEVEL	21	OVRLAP	DATE = 78102	10/47/48
			DO 1040 I=1,N2		00016450
1040			RPSIN(I+NSUM)=RPSN(I)		00016460
			NSUM=NSUM+N2		00016470
			RPSN(1)=RPS(NRN2)		00016480
			RPSN(2)=RPS(NRN2+1)		00016490
			K=KN		00016500
			DO 107 I=1,NS		00016510
			L=K-IFACT*(I-1)		00016520
			IF(L.LT.NS) L=1		00016530
			IF(L.LT.1) L=NS		00016540
			IF(L.EQ.1.AND.IFACT.EQ.-1) K=2-I		00016550
			IF(L.EQ.NS.AND.IFACT.EQ.1) K=NS+I-1		00016560
			L2=2*L-1		00016570
			M=I+1		00016580
			M2=2*M-1		00016590
			RPSN(M2)=SPS(L2)		00016600
			RPSN(M2+1)=SPS(L2+1)		00016610
			IF(L.EQ.K) GO TO 108		00016620
107			CONTINUE		00016630
108			M=M+1		00016640
			M2=2*M-1		00016650
			RPSN(M2)=RPS(1)		00016660
			RPSN(M2+1)=RPS(2)		00016670
			NRPLSN=NRPLSN+1		00016680
			GO TO 115		00016690
110			M=NRN		00016700
115			NRPLSN(NRPLSN)=M		00016710
			N2=2*M		00016720
			DO 118 I=1,N2		00016730
118			RPSIN(I+NSUM)=RPSN(I)		00016740
			NSUM=NSUM+N2		00016750
120			CONTINUE		00016760
			RETURN		00016770
			END		00016780



6 LEVEL 21	INTERC	DATE = 78102	10/47/48
SUBROUTINE INTERC(POINTS,NPTS,X1,Y1,X2,Y2,X,Y,KL,IFAU,LT)			00016790
1 IDOUBL,XALSO,YALSO)			00016800
DIMENSION POINTS(1)			00016810
DIMENSION IPTS(200),XINT(200),YINT(200)			00016820
COMMON/TOLRS/TOLEQN,TOLSNT,TOLQPT,TOL+TOLCK1,TOLCK2,			00016830
1 TOLCK4,DELT,TOLCIR,ANGST2,TOLPLT			00016840
NINTC=0			00016850
IFAU=1			00016860
DO 74 I=1,NPTS			00016870
IP1=I+1			00016880
IF(I.EQ.NPTS) IP1=1			00016890
I2=2+I-1			00016900
I2P1=2*IP1-1			00016910
X3=POINTS(I2)			00016920
Y3=POINTS(I2+1)			00016930
X4=POINTS(I2P1)			00016940
Y4=POINTS(I2P1+1)			00016950
XMIN=X3			00016960
XMAX=X3			00016970
YMIN=Y3			00016980
YMAX=Y3			00016990
IF(X4.LT.X3) XMIN=X4			00017000
IF(X4.GT.X3) XMAX=X4			00017010
IF(Y4.LT.Y3) YMIN=Y4			00017020
IF(Y4.GT.Y3) YMAX=Y4			00017030
XMIN=XMIN-TOL/2.			00017040
YMIN=YMIN-TOL/2.			00017050
XMAX=XMAX+TOL/2.			00017060
YMAX=YMAX+TOL/2.			00017070
DEL1=X2-X1			00017080
DEL2=X4-X3			00017090
IF(ABS(DEL1).LT.TOL) GO TO 10			00017100
SA1=(Y2-Y1)/DEL1			00017110
SB1=Y1-SA1*X1			00017120
10	IF(ABS(DEL2).LT.TOL) GO TO 20		00017130
	SA2=(Y4-Y3)/DEL2		00017140
	SB2=Y3-SA2*X3		00017150
20	IF(ABS(DEL1).GE.TOL) GO TO 40		00017160
	IF(ABS(DEL2).GE.TOL) GO TO 30		00017170
	GO TO 74		00017180
30	NINTC=NINTC+1		00017190
	XINT(NINTC)=X1		00017200
	YINT(NINTC)=SA2*X1+SB2		00017210
	IPTS(NINTC)=I		00017220
	GO TO 70		00017230
40	IF(ABS(DEL2).GE.TOL) GO TO 50		00017240
	NINTC=NINTC+1		00017250
	XINT(NINTC)=X3		00017260
	YINT(NINTC)=SA1*X3+SB1		00017270
	IPTS(NINTC)=I		00017280
	GO TO 70		00017290
50	DIFFA=SA1-SA2		00017300

G LEVEL	21	INTERC	DATE = 78102	10/47/48
		IF(ABS(DIFFA).LT.TOL) GO TO 74		00017310
		NINTC=NINTC+1		00017320
		XINT(NINTC)=(SB2-SB1)/DIFFA		00017330
		YINT(NINTC)=SA1*XINT(NINTC)+SB1		00017340
		IPTS(NINTC)=I		00017350
70		CONTINUE		00017360
		CALL CHECK3(XMIN,XMAX,YMIN,YMAX,XINT(NINTC),YINT(NINTC),IBETW)		00017370
		IF(IBETW.EQ.1) IPTS(NINTC)=0		00017380
74		CONTINUE		00017390
		IF(NINTC.GT.0) IFAULT=0		00017400
		IF(IFAULT.EQ.1) RETURN		00017410
		XMIN=X1		00017420
		XMAX=X1		00017430
		YMIN=Y1		00017440
		YMAX=Y1		00017450
		IF(X2.LT.X1) XMIN=X2		00017460
		IF(X2.GT.X1) XMAX=X2		00017470
		IF(Y2.LT.Y1) YMIN=Y2		00017480
		IF(Y2.GT.Y1) YMAX=Y2		00017490
		XMIN=XMIN-TOL/2.		00017500
		YMIN=YMIN-TOL/2.		00017510
		XMAX=XMAX+TOL/2.		00017520
		YMAX=YMAX+TOL/2.		00017530
		DO 80 I=1,NINTC		00017540
		IF(IDOUBL.EQ.0) GO TO 75		00017550
		IF(ABS(XINT(I)-XALSO).LT.TOL.AND.ABS(YINT(I)-YALSO).LT.		00017560
		1 TOL) IPTS(I)=0		00017570
75		IF(XINT(I).LT.XMIN) IPTS(I)=0		00017580
		IF(XINT(I).GT.XMAX) IPTS(I)=0		00017590
		IF(YINT(I).LT.YMIN) IPTS(I)=0		00017600
		IF(YINT(I).GT.YMAX) IPTS(I)=0		00017610
80		CONTINUE		00017620
		IFAULT=1		00017630
		DO 90 I=1,NINTC		00017640
		IF(IPTS(I).EQ.0) GO TO 90		00017650
		IF(IFAULT.EQ.0) GO TO 85		00017660
		IFAULT=0		00017670
		DIST=(XINT(I)-X1)**2+(YINT(I)-Y1)**2		00017680
		M=I		00017690
		GO TO 90		00017700
85		DIST2=(XINT(I)-X1)**2+(YINT(I)-Y1)**2		00017710
		IF(DIST2.LT.DIST) M=I		00017720
		IF(M.EQ.I) DIST=DIST2		00017730
90		CONTINUE		00017740
		IF(IFAULT.EQ.1) RETURN		00017750
		KL=IPTS(M)		00017760
		X=XINT(M)		00017770
		Y=YINT(M)		00017780
		RETURN		00017790
		END		00017800

6 LEVEL	21	CLOSE	DATE = 78102	10/47/48
		SUBROUTINE CLOSE(ARRAY,NPTS,X1,Y1,K)		00017810
		DIMENSION ARRAY(1)		00017820
		K=1		00017830
		DIST=(ARRAY(1)-X1)**2+(ARRAY(2)-Y1)**2		00017840
		IF(NPTS.EQ.1) RETURN		00017850
		DO 10 I=2,NPTS		00017860
		I2=2+I-1		00017870
		DIST2=(ARRAY(I2)-X1)**2+(ARRAY(I2+1)-Y1)**2		00017880
		IF(DIST2.LT.DIST) K=I		00017890
10		CONTINUE		00017900
		RETURN		00017910
		END		00017920



6 LEVEL 21

CHECK1

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	SUBROUTINE CHECK1(X1,Y1,ARRAY,N,ICOMP)	00017930
	DIMENSION ARRAY(1)	00017940
	COMMON/TOLRS/TOLEQN,TOL SNT,TOLQPT,TOLINT,TOL,TOLCK2,	00017950
	1 TOLCK4,DELT,TOLCIR,ANGST2,TOLPLT	00017960
	ICOMP=0	00017970
	DO 10 I=1,N	00017980
	I2=2+I-1	00017990
	X=ARRAY(I2)	00018000
	Y=ARRAY(I2+1)	00018010
	IF(ABS(X-X1).LT.TOL.AND.ABS(Y-Y1).LT.TOL) GO TO 15	00018020
10	CONTINUE	00018030
	RETURN	00018040
15	ICOMP=1	00018050
	RETURN	00018060
	END	00018070



G LEVEL	21	CHECK2	DATE = 78102	10/47/48
		SUBROUTINE CHECK2(X1,Y1,ARRAY,NPLS,NPTAR,ICOMP)		00018080
		DIMENSION ARRAY(1),NPTAR(1)		00018090
		COMMON/TOLRS/TOLEQN,TOLSNT,TOLQPT,TOLINT,TOLCK1,TOL		00018100
		1 TOLCK4,DELT,TOLCIR,ANGST2,TOLPLT		00018110
		ICOMP=0		00018120
		NSUM=0		00018130
		DO 20 L=1,NPLS		00018140
		NPTS=NPTAR(L)		00018150
		DO 10 I=1,NPTS		00018160
		K2=NSUM+2*I-1		00018170
		X=ARRAY(K2)		00018180
		Y=ARRAY(K2+1)		00018190
		IF(ABS(X1-X).GE.TOL) GO TO 10		00018200
		IF(ABS(Y1-Y).GE.TOL) GO TO 10		00018210
		ICOMP=1		00018220
		RETURN		00018230
10		CONTINUE		00018240
		NSUM=NSUM+2*NPTS		00018250
20		CONTINUE		00018260
		RETURN		00018270
		END		00018280

G LEVEL	21	CHECK3	DATE = 78102	10/47/48
		SUBROUTINE CHECK3(XMIN,XMAX,YMIN,YMAX,X,Y,IBETW)		00018290
		IBETW=0		00018300
		IF(X.LT.XMIN) IBETW=1		00018310
		IF(X.GT.XMAX) IBETW=1		00018320
		IF(Y.LT.YMIN) IBETW=1		00018330
		IF(Y.GT.YMAX) IBETW=1		00018340
		RETURN		00018350
		END		00018360

6 LEVEL	21	CHECK4	DATE = 78102	10/47/48
		SUBROUTINE CHECK4(RPS,NR,SPS,NS)		00018370
		DIMENSION RPS(1),SPS(1)		00018380
		COMMON/TOLRS/TOLERN,TOLSNT,TOLQPT,TOLINT,TOLCK1,TOLCK2,		00018390
	1	TOL,DELT,TOLCIR,ANGST2,TOLPLT		00018400
		DO 30 I=1,NR		00018410
		I2=(I-1)*2+1		00018420
		I2P2=I2+2		00018430
		IF(I.EQ.NR) I2P2=1		00018440
		XR1=RPS(I2)		00018450
		YR1=RPS(I2+1)		00018460
		XR2=RPS(I2P2)		00018470
		YR2=RPS(I2P2+1)		00018480
		ISWTC=1		00018490
		IF(ABS(XR2-XR1).LE.TOL) ISWTC=2		00018500
		IF(ABS(YR2-YR1).LE.TOL) ISWTC=3		00018510
		IF(ISWTC.NE.1) GO TO 15		00018520
		ASLOPE=(YR2-YR1)/(XR2-XR1)		00018530
		BINT=YR1-ASLOPE*XR1		00018540
		AINSL=-1./ASLOPE		00018550
	15	DO 20 J=1,NS		00018560
		J2=(J-1)*2+1		00018570
		XS1=SPS(J2)		00018580
		YS1=SPS(J2+1)		00018590
		GO TO (16,17,18), ISWTC		00018600
	16	XS1L=(YR1-YS1*AINSL*XS1-ASLOPE*XR1)/(AINSL-ASLOPE)		00018610
		YS1L=YR1-ASLOPE*(XS1L-XR1)		00018620
		DIST=SQRT((XS1L-XS1)**2+(YS1L-YS1)**2)		00018630
		IF(DIST.GT.TOL) GO TO 20		00018640
		ALPHA=ATAN(AINSL)		00018650
		XS1P=XS1L*DELT*COS(ALPHA)		00018660
		YS1P=YS1L*DELT*SIN(ALPHA)		00018670
		CALL CIRCLE(RPS,NR,XS1P,YS1P,INCR)		00018680
		IF(INCR.EQ.0) GO TO 160		00018690
		XS1P=XS1L*DELT*COS(ALPHA)		00018700
		YS1P=YS1L*DELT*SIN(ALPHA)		00018710
	160	SPS(J2)=XS1P		00018720
		SPS(J2+1)=YS1P		00018730
		GO TO 20		00018740
	17	IF(ABS(XS1-XR2).GT.TOL) GO TO 20		00018750
		XS1P=XS1*DELT		00018760
		YS1P=YS1		00018770
		CALL CIRCLE(RPS,NR,XS1P,YS1P,INCR)		00018780
		IF(INCR.EQ.0) GO TO 160		00018790
		XS1P=XS1*DELT		00018800
		GO TO 160		00018810
	18	IF(ABS(YS1-YR2).GT.TOL) GO TO 20		00018820
		YS1P=YS1*DELT		00018830
		XS1P=XS1		00018840
		CALL CIRCLE(RPS,NR,XS1P,YS1P,INCR)		00018850
		IF(INCR.EQ.0) GO TO 160		00018860
		YS1P=YS1*DELT		00018870
		GO TO 160		00018880



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00018890  
00018900  
00018910  
00018920



G LEVEL	21	CIRCLE	DATE = 78102	10/47/48
		SUBROUTINE CIRCLE(POINTS,NPTS,XC,YC,INCR)		00018930
		DIMENSION POINTS(1)		00018940
		COMMON/TOLRS/TOLERN,TOLSN,TOLQPT,TOLINT,TOLCK1,TOLCK2,		00018950
	1	TOLCK4,DELT,TOL1,ANGST2,TOLPLT		00018960
		NPC=0		00018970
		NNC=0		00018980
		DO 10 I=1,NPTS		00018990
		IP1=I+1		00019000
		IF(I.EQ.NPTS) IP1=1		00019010
		L=(I-1)*2		00019020
		LP1=(IP1-1)*2		00019030
		DISX1=POINTS(L+1)-XC		00019040
		DISY1=POINTS(L+2)-YC		00019050
		DISX2=POINTS(LP1+1)-XC		00019060
		DISY2=POINTS(LP1+2)-YC		00019070
		IF(ABS(DISX1).LT.TOL1.AND.ABS(DISY1).LT.TOL1) GO TO 20		00019080
		IF(ABS(DISX2).LT.TOL1.AND.ABS(DISY2).LT.TOL1) GO TO 20		00019090
		IF(ABS(DISX1).GE.TOL1) GO TO 3		00019100
		IF(ABS(DISX2).GE.TOL1) GO TO 1		00019110
		IF((DISY1/DISY2).GT.0.0) GO TO 10		00019120
		GO TO 20		00019130
	1	IF(ABS(DISY2).GE.TOL1) GO TO 2		00019140
		X=DISX2		00019150
		GO TO 8		00019160
	2	IF(ABS(DISY1-DISY2).LT.TOL1) GO TO 10		00019170
		GO TO 5		00019180
	3	IF(ABS(DISY1).GE.TOL1) GO TO 32		00019190
		IF(ABS(DISX2).LT.TOL1) GO TO 10		00019200
		IF(ABS(DISY2).GE.TOL1) GO TO 10		00019210
		IF((DISX1/DISX2).GT.0.0) GO TO 10		00019220
		GO TO 20		00019230
	32	IF(ABS(DISX2).GE.TOL1) GO TO 34		00019240
		GO TO 36		00019250
	34	IF(ABS(DISY2).GE.TOL1) GO TO 36		00019260
		X=DISX2		00019270
		GO TO 8		00019280
	36	IF(ABS(DISY2-DISY1).LT.TOL1) GO TO 10		00019290
		IF(ABS(DISX2-DISX1).GE.TOL1) GO TO 5		00019300
		IF((DISY1/DISY2).GT.0.0) GO TO 10		00019310
		X=DISX2		00019320
		GO TO 8		00019330
	5	SA=(DISY2-DISY1)/(DISX2-DISX1)		00019340
		SB=DISY1-SA*DISX1		00019350
		X=-SB/SA		00019360
		IF(X.LT.DISX1.AND.X.LT.DISX2) GO TO 10		00019370
		IF(X.GT.DISX1.AND.X.GT.DISX2) GO TO 10		00019380
	8	IF(ABS(X).LT.TOL1) GO TO 20		00019390
		IF(X.LT.0.0) NNC=NNC+1		00019400
		IF(X.GT.0.0) NPC=NPC+1		00019410
	10	CONTINUE		00019420
		INCR=0		00019430
		IF(2*(NPC/2).EQ.NPC) RETURN		00019440

G LEVEL	21	CIRCLE	DATE = 78102	10/47/48
		IF (2*(NMC/2).EQ.NMC) RETURN		00019450
		INCR=1		00019460
		RETURN		00019470
20		INCR=2		00019480
		RETURN		00019490
		END		00019500

6 LEVEL	21	AREA	DATE = 78102	10/47/48
		SUBROUTINE AREA(X,Y,NPTS,YINTG)		00019510
		DIMENSION X(1),Y(1)		00019520
		XLOW=X(1)		00019530
		XHIGH=XLOW		00019540
		KMIN=1		00019550
		KMAX=1		00019560
		DO 10 I=2,NPTS		00019570
		IF(X(I).GE.XLOW) GO TO 5		00019580
		KMIN=I		00019590
		XLOW=X(I)		00019600
	5	IF(X(I).LE.XHIGH) GO TO 10		00019610
		KMAX=I		00019620
		XHIGH=X(I)		00019630
	10	CONTINUE		00019640
		IF(KMIN.EQ.KMAX) GO TO 70		00019650
		L1=KMIN		00019660
		L2=KMAX		00019670
		IF(KMAX.LT.KMIN) L2=NPTS+KMAX		00019680
		NTABS=L2-L1		00019690
		YINTG=0.		00019700
		DO 20 L=1,NTABS		00019710
		K1=L1+L-1		00019720
		IF(K1.GT.NPTS) K1=K1-NPTS		00019730
		K2=L1+L		00019740
		IF(K2.GT.NPTS) K2=K2-NPTS		00019750
		DX=X(K2)-X(K1)		00019760
	20	YINTG=YINTG+(DX/2.)*(Y(K1)+Y(K2))		00019770
		L2=KMAX		00019780
		IF(KMAX.GT.KMIN) L2=KMAX-NPTS		00019790
		NTABS=L1-L2		00019800
		DO 30 L=1,NTABS		00019810
		K1=L1-L+1		00019820
		IF(K1.LT.1) K1=K1+NPTS		00019830
		K2=L1-L		00019840
		IF(K2.LT.1) K2=K2+NPTS		00019850
		DX=X(K2)-X(K1)		00019860
	30	YINTG=YINTG-(DX/2.)*(Y(K1)+Y(K2))		00019870
		YINTG=ABS(YINTG)		00019880
		RETURN		00019890
	70	YLOW=Y(1)		00019900
		YHIGH=YLOW		00019910
		DO 80 I=2,NPTS		00019920
		IF(Y(I).LT.YLOW) YLOW=Y(I)		00019930
		IF(Y(I).GT.YHIGH) YHIGH=Y(I)		00019940
	80	CONTINUE		00019950
		YINTG=YHIGH-YLOW		00019960
		RETURN		00019970
		END		00019980



G LEVEL 21

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	SUBROUTINE PLOTOL(DATAC,DATAS,MS,TITLES,GAMMA,APLOT,BPLOT,	00019990
1	VPROBL,IPLTOL)	00020000
	DIMENSION IPLTOL(1)	00020010
	DIMENSION DATAC(1),DATAS(1),MS(1),TITLES(1),APLOT(1),BPLOT(1)	00020020
	DIMENSION XPR(10),OUT(91),SYMBOL(9)	00020030
	DATA BLANK,PERIOD,FI/1H,1H.,1HI/	00020040
	DATA SYMBOL/1HA,1HB,1HC,1HD,1HE,1HF,1HG,1HK,1HM/	00020050
	DIMENSION HEAD(9)	00020060
	WRITE(6,101) (TITLES(I),I=1,80)	00020070
101	FORMAT(1H1,80A1)	00020080
	WRITE(6,209)	00020090
	WRITE(6,102) GAMMA,DATAC(4),DATAC(5)	00020100
	ALOW=DATAC(16)	00020110
	AMHIGH=DATAC(17)	00020120
	BHIGH=DATAC(19)	00020130
	BLOW=DATAC(18)	00020140
	DELX=(BHIGH-BLOW)/90.	00020150
	DELY=(AMHIGH-ALOW)/20.	00020160
	KPRINT=5	00020170
	NPANEL=DATAC(23)+0.5	00020180
	NPSI=DATAC(9)+0.5	00020190
	DPSI=DATAC(11)	00020200
	PSI=DATAC(10)-DPSI	00020210
	DO 20 I=1,NPSI	00020220
	PSI=PSI+DPSI	00020230
20	HEAD(I)=PSI	00020240
	TY2=AMHIGH+DELY/2.	00020250
	DO 140 I=1,21	00020260
	TY1=TY2-DELY	00020270
	DO 30 J=1,91	00020280
30	OUT(J)=BLANK	00020290
	IF(KPRINT.EQ.5) OUT(1)=FI	00020300
	IF(KPRINT.NE.5) OUT(1)=PERIOD	00020310
	IF(KPRINT.EQ.5) OUT(91)=FI	00020320
	IF(KPRINT.NE.5) OUT(91)=PERIOD	00020330
	IF(I.NE.1.AND.I.NE.21) GO TO 50	00020340
	L=9	00020350
	DO 40 J=1,91	00020360
	L=L+1	00020370
	OUT(J)=PERIOD	00020380
	IF(L.EQ.10) OUT(J)=FI	00020390
40	IF(L.EQ.10) L=0	00020400
50	CONTINUE	00020410
	MAS=0	00020420
	DO 90 K=1,NPANEL	00020430
	DO 60 J=1,NPSI	00020440
	DO 75 L=1,4	00020450
	MAS=MAS+1	00020460
	IF(APLOT(MAS).GT.TY2) GO TO 75	00020470
	IF(APLOT(MAS).LE.TY1) GO TO 75	00020480
	IF(IPLTOL(MAS).EQ.1) GO TO 75	00020490
	TX2=BLOW+DELX/2.	00020500



6 LEVEL	21	PLOTOL	DATE = 78102	10/47/48
		DO 55 M=1,91		00020510
		TX1=TX2-DELX		00020520
		IF(BPLOT(MAS).LT.TX2.AND.BPLOT(MAS).GE.TX1) GO TO 58		00020530
55		TX2=TX2-DELX		00020540
58		OUT(M)=SYMBOL(J)		00020550
75		CONTINUE		00020560
60		CONTINUE		00020570
90		CONTINUE		00020580
		YPL0T=TY2-DELY/2.		00020590
		IF(KPRINT.EQ.5) WRITE(6,201) YPLOT,OUT,YPLOT		00020600
		IF(KPRINT.NE.5) WRITE(6,205) OUT		00020610
		IF(KPRINT.EQ.5) KPRINT=0		00020620
		KPRINT=KPRINT+1		00020630
140		TY2=TY2-DELY		00020640
		XPR(1)=BL0W		00020650
		DO 150 I=2,10		00020660
150		XPR(I)=XPR(I-1)+10.*DELX		00020670
		WRITE(6,204)		00020680
		WRITE(6,202) XPR		00020690
		WRITE(6,207)		00020700
		WRITE(6,217) VPROBL		00020710
217		FORMAT(1H0,105X,*PROBABILITY:*,F6.3)		00020720
		WRITE(6,210)		00020730
		DO 160 L=1,4		00020740
		K=9-NPSI+L		00020750
		IF(K.LE.4) WRITE(6,211) SYMBOL(L),HEAD(L),SYMBOL(L+5),HEAD(L+5)		00020760
		IF(K.GT.4.AND.K.LE.9) WRITE(6,212) SYMROL(L),HEAD(L),SYMBOL(L+5)		00020770
		IF(K.GT.9) WRITE(6,213) SYMBOL(L),SYMBOL(L+5)		00020780
160		CONTINUE		00020790
		IF(NPSI.LT.5) WRITE(6,215) SYMROL(5)		00020800
		IF(NPSI.GT.5) WRITE(6,216) SYMROL(5),HEAD(5)		00020810
		WRITE(6,214)		00020820
210		FORMAT(///1H ,22X,76(*))/1H ,22X,*,*,74X,*,*/1H ,22X,*,*,2X,		00020830
		1 *KEY TO PLOT SYMBOLS*,53X,*/1H ,22X,*,*,74X,*,*/1H ,22X,		00020840
		2 *,*,4X,*SYMBOL*,5X,*A/C HEADING (DEG)*,10X,*SYMBOL*,5X,		00020850
		3 *A/C HEADING (DEG)*,4X,*,*,		00020860
211		FORMAT(1H ,22X,*,*,7X,A1,12X,F7.2,18X,A1,12X,F7.2,9X,*,*)		00020870
212		FORMAT(1H ,22X,*,*,7X,A1,12X,F7.2,18X,A1,28X,*,*)		00020880
213		FORMAT(1H ,22X,*,*,7X,A1,37X,A1,28X,*,*)		00020890
214		FORMAT(1H ,22X,*,*,74X,*,*/1H ,22X,*,*,74X,*,*/1H ,22X,76(*))		00020900
215		FORMAT(1H ,22X,*,*,7X,A1,66X,*,*)		00020910
216		FORMAT(1H ,22X,*,*,7X,A1,12X,F7.2,47X,*,*)		00020920
102		FORMAT(1H0,*SUN ELEVATION*,F12.2/1H ,*,A/C PITCH ATTITUDE*,		00020930
		1 F7.2/1H ,*,A/C ROLL ATTITUDE*,F8.2/1H ,*,OBSERVER ANGLE*,93X,		00020940
		2 *OBSERVER ANGLE*/1H ,3X,*DEGREES*,100X,*DEGREES*/)		00020950
204		FORMAT(/)		00020960
202		FORMAT(1H ,9X,10F10.3)		00020970
207		FORMAT(/,38X,*GLINT AZIMUTH WITH RESPECT TO SUN - DEGREES*)		00020980
201		FORMAT(1H ,F10.3,5X,91A1,1X,F10.3)		00020990
205		FORMAT(1H ,15X,91A1)		00021000
209		FORMAT(1H0,50X,*SUN GLINT SIGNATURE*)		00021010
		RETURN		00021020

G LEVEL 21

PLOTOL

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END

00021030

G LEVEL	21	ORPLOT	DATE = 78102	10/47/48
		SUBROUTINE DRPLOT(DATA, DATAS, MS, GAMMA, ALPHA2, BETA2,		00021040
		1 INTRFL, ISHADW, INTERF, XPLOT, YPLOT, IBUF, JCONT, DWORKS, DWKSP2, VPROBL)		00021050
		DIMENSION DATA(1), DATAS(1), MS(1), TITLES(1), ALPHA2(1), BETA2(1),		00021060
		1 XPLOT(1), YPLOT(1), IBUF(1), INTRFL(1), ISHADW(1), INTERF(1)		00021070
		DIMENSION DWORKS(1), DWKSP2(1)		00021080
		IZPTS=0		00021090
		ICONT=1		00021100
		JCONT=JCONT+1		00021110
		IRFLTN=DATA(3)+0.5		00021120
		THETA=DATA(4)		00021130
		PHI=DATA(5)		00021140
		NPANEL=DATA(23)+0.5		00021150
		NPSI=DATA(9)+0.5		00021160
		IAPL=DATA(16)+0.5		00021170
		IF(DATA(16).LT.0.) IAPL=DATA(16)-0.5		00021180
		IDAL=(DATA(17)-DATA(16))/2.+0.5		00021190
		IBET=DATA(18)+0.5		00021200
		IF(DATA(18).LT.0.) IBET=DATA(18)-0.5		00021210
		IDBT=(DATA(19)-DATA(18))/6.+0.5		00021220
		BETL=IBET		00021230
		DBT=IDBT		00021240
		ALPL=IAPL		00021250
		DAL=IDAL		00021260
		MAS=0		00021270
		DPSI=DATA(11)		00021280
		DO 90 I=1,NPANEL		00021290
		K=MS(I)		00021300
		NPTS=DATAS(K)+0.5		00021310
		PSI=DATA(10)-DPSI		00021320
		DO 60 J=1,NPSI		00021330
		PSI=PSI+DPSI		00021340
		MPTS=0		00021350
		DO 75 L=1,NPTS		00021360
		MAS=MAS+1		00021370
		IF(IRFLTN.NE.INTRFL(MAS)) GO TO 75		00021380
		MPTS=MPTS+1		00021390
		XPLOT(MPTS)=BETA2(MAS)		00021400
		YPLOT(MPTS)=ALPHA2(MAS)		00021410
	75	CONTINUE		00021420
		IF(MPTS.EQ.0) GO TO 60		00021430
		CALL SORT(XPLOT, YPLOT, MPTS, DATA(17), DATA(16), DWKSP2)		00021440
		IF(MPTS.EQ.0) GO TO 60		00021450
		CALL SORT2(XPLOT, YPLOT, MPTS, MPTS1, MPTS2, DWORKS, DWKSP2)		00021460
		IF(MPTS2.EQ.0) GO TO 77		00021470
		CALL SORT(YPLOT, XPLOT, MPTS1, DATA(19), DATA(18), DWKSP2)		00021480
		IF(MPTS1.EQ.0) GO TO 20		00021490
		CALL GPLOT(ALPL, DAL, GAMMA, THETA, PHI, PSI, MPTS1, ICONT, XPLOT, YPLOT,		00021500
		1 IBUF, JCONT, BETL, DBT, VPROBL, IZPTS)		00021510
		ICONT=0		00021520
	20	CONTINUE		00021530
		DO 76 KKK=1, MPTS2		00021540
		LML=(KKK-1)*2		00021550



G LEVEL	21	DRPLOT	DATE = 78102	10/47/48
		XPLOT(KKK)=DWORKS(LML+1)		00021560
76		YPLOT(KKK)=DWORKS(LML+2)		00021570
		MPTS=MPTS2		00021580
77		CONTINUE		00021590
		CALL SORT(YPLOT,XPLOT,MPTS,DATA(19),DATA(18),DWKSP2)		00021600
		IF(MPTS.EQ.0) GO TO 60		00021610
		CALL GPLOT(ALPL,DAL,GAMMA,THETA,PHI,PSI,MPTS,ICONT,XPLOT,YPLOT,		00021620
1		IBUF,JCONT,BETL,DBT,VPROBL,IZPTS)		00021630
		ICONT=0		00021640
60		CONTINUE		00021650
90		CONTINUE		00021660
		IF(ICONT.EQ.0) RETURN		00021670
		IZPTS=1		00021680
		CALL GPLOT(ALPL,DAL,GAMMA,THETA,PHI,PSI,MPTS,ICONT,XPLOT,YPLOT,		00021690
1		IBUF,JCONT,BETL,DBT,VPROBL,IZPTS)		00021700
		RETURN		00021710
		END		00021720



6 LEVEL	21	SORT	DATE = 78102	10/47/48
		SUBROUTINE SORT(XPLOT,YPLOT,MPTS,AHIGH,ALOW,DWORKS)		00021730
		DIMENSION XPLOT(1),YPLOT(1),DWORKS(1)		00021740
		INTC=0		00021750
		LPTS=0		00021760
		DO 5 I=1,MPTS		00021770
		KPT=(I-1)*2		00021780
		DWORKS(KPT+1)=XPLOT(I)		00021790
5		DWORKS(KPT+2)=YPLOT(I)		00021800
		DO 70 I=1,MPTS		00021810
		IP1=I+1		00021820
		IF(I.EQ.MPTS) IP1=1		00021830
		IFL1=2		00021840
		IFL2=2		00021850
		KPT=(I-1)*2		00021860
		KPT1=(IP1-1)*2		00021870
		X1=DWORKS(KPT+1)		00021880
		Y1=DWORKS(KPT+2)		00021890
		X2=DWORKS(KPT1+1)		00021900
		Y2=DWORKS(KPT1+2)		00021910
		IF(Y1.GT.AHIGH) IFL1=1		00021920
		IF(Y2.GT.AHIGH) IFL2=1		00021930
		IF(Y1.LT.ALOW) IFL1=3		00021940
		IF(Y2.LT.ALOW) IFL2=3		00021950
		IF(Y1.NE.Y2) RATIO=(X2-X1)/(Y2-Y1)		00021960
		GO TO (1,2,3), IFL1		00021970
1		GO TO (11,12,13), IFL2		00021980
2		GO TO (21,22,23), IFL2		00021990
3		GO TO (31,32,33), IFL2		00022000
11		IF(INTC.EQ.0) GO TO 60		00022010
		LPTS=LPTS+1		00022020
		XPLOT(LPTS)=XSAVE		00022030
		YPLOT(LPTS)=YSAVE		00022040
		INTC=0		00022050
		GO TO 60		00022060
12		IF(INTC.EQ.0) GO TO 120		00022070
		LPTS=LPTS+1		00022080
		XPLOT(LPTS)=XSAVE		00022090
		YPLOT(LPTS)=YSAVE		00022100
		INTC=0		00022110
120		LPTS=LPTS+1		00022120
		XPLOT(LPTS)=X1+RATIO*(AHIGH-Y1)		00022130
		YPLOT(LPTS)=AHIGH		00022140
		GO TO 60		00022150
13		IF(INTC.EQ.0) GO TO 130		00022160
		LPTS=LPTS+1		00022170
		XPLOT(LPTS)=XSAVE		00022180
		YPLOT(LPTS)=YSAVE		00022190
130		LPTS=LPTS+1		00022200
		XPLOT(LPTS)=X1+RATIO*(AHIGH-Y1)		00022210
		YPLOT(LPTS)=AHIGH		00022220
		XSAVE=X1+RATIO*(ALOW-Y1)		00022230
		YSAVE=ALOW		00022240

6 LEVEL	21	SORT	DATE = 78102	10/47/48
		INTC=1		00022250
		GO TO 60		00022260
21		IF (INTC.EQ.0) GO TO 210		00022270
		LPTS=LPTS+1		00022280
		XPLLOT(LPTS)=XSAVE		00022290
		YPLLOT(LPTS)=YSAVE		00022300
210		LPTS=LPTS+1		00022310
		XPLLOT(LPTS)=X1		00022320
		YPLLOT(LPTS)=Y1		00022330
		XSAVE=X1+RATIO*(AHIGH-Y1)		00022340
		YSAVE=AHIGH		00022350
		INTC=1		00022360
		GO TO 60		00022370
22		IF (INTC.EQ.0) GO TO 220		00022380
		LPTS=LPTS+1		00022390
		XPLLOT(LPTS)=XSAVE		00022400
		YPLLOT(LPTS)=YSAVE		00022410
		INTC=0		00022420
220		LPTS=LPTS+1		00022430
		XPLLOT(LPTS)=X1		00022440
		YPLLOT(LPTS)=Y1		00022450
		GO TO 60		00022460
23		IF (INTC.EQ.0) GO TO 230		00022470
		LPTS=LPTS+1		00022480
		XPLLOT(LPTS)=XSAVE		00022490
		YPLLOT(LPTS)=YSAVE		00022500
230		LPTS=LPTS+1		00022510
		XPLLOT(LPTS)=X1		00022520
		YPLLOT(LPTS)=Y1		00022530
		XSAVE=X1+RATIO*(ALOW-Y1)		00022540
		YSAVE=ALOW		00022550
		INTC=1		00022560
		GO TO 60		00022570
31		IF (INTC.EQ.0) GO TO 310		00022580
		LPTS=LPTS+1		00022590
		XPLLOT(LPTS)=XSAVE		00022600
		YPLLOT(LPTS)=YSAVE		00022610
310		LPTS=LPTS+1		00022620
		XPLLOT(LPTS)=X1+RATIO*(ALOW-Y1)		00022630
		YPLLOT(LPTS)=ALOW		00022640
		XSAVE=X1+RATIO*(AHIGH-Y1)		00022650
		YSAVE=AHIGH		00022660
		INTC=1		00022670
		GO TO 60		00022680
32		IF (INTC.EQ.0) GO TO 320		00022690
		LPTS=LPTS+1		00022700
		XPLLOT(LPTS)=XSAVE		00022710
		YPLLOT(LPTS)=YSAVE		00022720
		INTC=0		00022730
320		LPTS=LPTS+1		00022740
		XPLLOT(LPTS)=X1+RATIO*(ALOW-Y1)		00022750
		YPLLOT(LPTS)=ALOW		00022760

G LEVEL	21	SORT	DATE = 78102	10/47/48
	GO TO 60			00022770
33	IF(INTC.EQ.0) GO TO 60			00022780
	LPTS=LPTS+1			00022790
	XPL0T(LPTS)=XSAVE			00022800
	YPL0T(LPTS)=YSAVE			00022810
	INTC=0			00022820
60	IF(INTC.EQ.0) GO TO 70			00022830
	IF(I.LT.MPTS) GO TO 70			00022840
	LPTS=LPTS+1			00022850
	XPL0T(LPTS)=XSAVE			00022860
	YPL0T(LPTS)=YSAVE			00022870
70	CONTINUE			00022880
	MPTS=LPTS			00022890
	RETURN			00022900
	END			00022910



G LEVEL 21

SORT2

DATE = 78102

10/47/48

	SUBROUTINE SORT2(XPLOT,YPLOT,MPTS,MPTS1,MPTS2,DWORKS,DWKSP2)	00022920
	DIMENSION XPLOT(1),YPLOT(1),DWORKS(1),DWKSP2(1)	00022930
	COMMON/TOLRS/TOLEQN,TOLSNT,TOLAPT,TOLINT,TOLCK1,TOLCK2,	00022940
	1 TOLCK4,DELT,TOLCIR,ANGST2,TOLPLT	00022950
	MPTS2=0	00022960
	IF(MPTS.EQ.1) RETURN	00022970
	BMIN=XPLOT(1)	00022980
	BMAX=BMIN	00022990
	DO 62 I=2,MPTS	00023000
	IF(XPLOT(I).LT.BMIN) BMIN=XPLOT(I)	00023010
	IF(XPLOT(I).GT.BMAX) BMAX=XPLOT(I)	00023020
62	CONTINUE	00023030
	IF(BMIN.GE.0.0) RETURN	00023040
	IF(BMAX.LE.0.0) RETURN	00023050
	DO 64 I=1,MPTS	00023060
	IF(ABS(XPLOT(I)).LE.45.) RETURN	00023070
64	CONTINUE	00023080
	BAVG=(BMAX-BMIN)/2.	00023090
	IF(BAVG.LT.ANGST2) RETURN	00023100
	DO 30 I=1,MPTS	00023110
	LPS=(I-1)*2	00023120
	DWORKS(LPS+1)=XPLOT(I)	00023130
	DWORKS(LPS+2)=YPLOT(I)	00023140
	IF(XPLOT(I).LT.0.0) XPLOT(I)=XPLOT(I)+360.	00023150
30	CONTINUE	00023160
	MPTS1=MPTS	00023170
	CALL SORT(YPLOT,XPLOT,MPTS1,180.,0.,DWKSP2)	00023180
	DO 35 I=1,MPTS1	00023190
	LPS=(I-1)*2	00023200
	DWKSP2(LPS+1)=XPLOT(I)	00023210
35	DWKSP2(LPS+2)=YPLOT(I)	00023220
	DO 40 I=1,MPTS	00023230
	LPS=(I-1)*2	00023240
	XPLOT(I)=DWORKS(LPS+1)	00023250
	YPLOT(I)=DWORKS(LPS+2)	00023260
	IF(XPLOT(I).GT.0.) XPLOT(I)=XPLOT(I)-360.	00023270
40	CONTINUE	00023280
	DO 45 I=1,MPTS1	00023290
	LPS=(I-1)*2	00023300
	DWORKS(LPS+1)=DWKSP2(LPS+1)	00023310
45	DWORKS(LPS+2)=DWKSP2(LPS+2)	00023320
	MPTS2=MPTS1	00023330
	MPTS1=MPTS	00023340
	CALL SORT(YPLOT,XPLOT,MPTS1,0.,-180.,DWKSP2)	00023350
	RETURN	00023360
	END	00023370



G LEVEL 21

GPLOT

DATE = 78102

10/47/48

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SUBROUTINE GPLOT(ALPL,DAL,SUNELV,THAC,PHAC,HEAD,NPTS,ICONT,
1 XPLOT,YPLOT,      IBUF,JCONT,BETL,DBT,VPROBL,IZPTS)
DIMENSION XPLOT(1),YPLOT(1),IBUF(1)
CALL FACTOR(.7857)
IF(ICONT.EQ.0)GO TO 10
GO TO(50,20,20,60,20,20,60,20,20,60,20,20,60,20,20),JCONT
50 CALL PLOT(2.,1.,-3)
CALL PLOT(-2.,-1.,3)
CALL PLOT(8.,8.,-1.,2)
CALL PLOT(8.,8.,13.,2)
CALL PLOT(-2.,13.,2)
CALL PLOT(-2.,-1.,2)
GO TO 30
20 CALL PLOT(0.,4.,-3)
GO TO 30
60 CALL PLOT(12.,-8.,-3)
CALL PLOT(-2.,-1.,3)
CALL PLOT(8.,8.,-1.,2)
CALL PLOT(8.,8.,13.,2)
CALL PLOT(-2.,13.,2)
CALL PLOT(-2.,-1.,2)
30 CONTINUE
C***** DRAW AXIS *****
CALL AXIS(0.,0.,16HORSEPOWER AZIMUTH,-16.,6.,0.,BETL,DBT)
CALL AXIS(0.,0.,21ELEVATION OF OBSERVER,21.,2.,90.,ALPL,DAL)
CALL PLOT(0.,1.,3)
CALL PLOT(6.,1.,2)
CALL PLOT(6.,0.,3)
CALL PLOT(6.,2.,2)
CALL PLOT(0.,2.,2)
CALL GRID(.01,.01,1.,1.,6.,2)
CALL SYMBOL(5.,2,3,6,10,12HPROBABILITY ,0.,11)
CALL NUMBER(999.,999.,0,10,VPROBL,0.,3)
IF(IZPTS.EQ.1) GO TO 19
10 CONTINUE
XPLOT(NPTS+1)=XPLOT(1)
YPLOT(NPTS+1)=YPLOT(1)
XPLOT(NPTS+2)=BETL
XPLOT(NPTS+3)=DBT
YPLOT(NPTS+2)=ALPL
YPLOT(NPTS+3)=DAL
ND=NPTS+1
CALL LINE(XPLOT,YPLOT,ND,1,0,4)
IF(HEAD.LT.0.) GO TO 15
AMAX=YPLOT(1)
LMAX=1
DO 12 I=2,NPTS
IF(YPLOT(I).GT.AMAX) LMAX=I
IF(LMAX.EQ.I) AMAX=YPLOT(LMAX)
12 CONTINUE
AMAX=(XPLOT(LMAX)-ALPL)/DAL+0.05
BMAX=(XPLOT(LMAX)-BETL)/DBT

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G LEVEL	21	6PLOT	DATE = 78102	10/47/48
		CALL NUMBER(BMAX,AMAX,0.07,HEAD,0.,-1)		00023900
		GO TO 19		00023910
15		AMIN=YPLOT(1)		00023920
		LMIN=1		00023930
		DO 17 I=2,NPTS		00023940
		IF(YPLOT(I).LT.AMIN) LMIN=I		00023950
		IF(LMIN.EQ.I) AMIN=YPLOT(LMIN)		00023960
17		CONTINUE		00023970
		AMIN=(YPLOT(LMIN)-ALPL)/DAL-0.05		00023980
		BMIN=(XPLOT(LMIN)-BETL)/DBT		00023990
		CALL NUMBER(BMIN,AMIN,0.07,HEAD,0.,-1)		00024000
19		CONTINUE		00024010
		IF(ICONT.EQ.0) GO TO 40		00024020
		CALL SYMBOL(1.8,2.1,0.10,25HHEADING OF AIRCRAFT (DEG),0.,25)		00024030
		CALL SYMBOL(0.,3.0.,10,22HSUN ELEVATION ANGLE = ,0.,22)		00024040
		CALL NUMBER(999.,999.,.10,SUNELV,0.,0)		00024050
		CALL SYMBOL(0.,2.8.,10,16HA/C PITCH ATT = ,0.,16)		00024060
		CALL NUMBER(999.,999.,.10,THAC,0.,1)		00024070
		CALL SYMBOL(0.,2.6.,10,15HA/C ROLL ATT = ,0.,15)		00024080
		CALL NUMBER(999.,999.,.10,PHAC,0.,1)		00024090
		IF(((JCONT-1)/3)*3.EQ.(JCONT-1)) CALL SYMBOL(3.4,3.4,		00024100
		1 0.14,19HSUN GLINT SIGNATURE,0.,19)		00024110
40		RETURN		00024120
		END		00024130

G LEVEL	21	GRID	DATE = 78102	10/47/48
		SUBROUTINE GRID(XORG,YORG,DELVLS,DELHLS,NVSPS,NHSPS)		00024140
		DYMAX=NHSPS*DELHLS		00024150
		DXMAX=NVSPS*DELVLS		00024160
		XMAX=XORG+DXMAX		00024170
		YMAX=YORG+DYMAX		00024180
		NVLS=NVSPS+1		00024190
		NHLS=NHSPS+1		00024200
		XPRES=XORG		00024210
		YPRES=YORG		00024220
		DO 10 I=1,NVLS		00024230
		CALL PLOT(XPRES,YPRES,3)		00024240
		FACT=(-1)**(I+1)		00024250
		YPRES=YPRES+FACT*DYMAX		00024260
		CALL PLOT(XPRES,YPRES,2)		00024270
		XPRES=XPRES+DELVLS		00024280
		CALL PLOT(XPRES,YPRES,3)		00024290
10		CONTINUE		00024300
		XPRES=XORG		00024310
		YPRES=YORG		00024320
		DO 20 I=1,NHLS		00024330
		CALL PLOT(XPRES,YPRES,3)		00024340
		FACT=(-1)**(I+1)		00024350
		XPRES=XPRES+FACT*DXMAX		00024360
		CALL PLOT(XPRES,YPRES,2)		00024370
20		YPRES=YPRES+DELHLS		00024380
		RETURN		00024390
		END		00024400